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M E M O R A N D U M

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: May 10, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho was 0.7 feet above schedule; Lake Toho was 0.8 feet above schedule and Kissimmee-Cypress-Hatchineha was 0.8 feet above schedule. Over the past week, discharge at S65 averaged 1,091 cfs and at S65A 1,143 cfs; discharge at S65E averaged 1,268 cfs. Tuesday morning discharges: S65 ~1,570 cfs; S65A ~1,470 cfs; S65C ~1,619 cfs; S65E ~1,625 cfs. Dissolved oxygen in the Kissimmee River averaged 5.94 mg/L over the past week and 5.93 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 0.80 feet.

Lake Okeechobee

The recession in Lake stage continued last week and the Lake dropped 0.22 feet. The Lake is at 13.90 feet NGVD and is in the Low Flow Sub-band. Ecological conditions for wading birds appear to be improving, but outcomes will depend on whether the recession continues and when the wet season begins.

Estuaries

Total freshwater inflow to the St. Lucie Estuary decreased compared to last week, averaging 971 cfs with 570 (59%) coming from Lake Okeechobee. Salinity was in the good range for adult oysters at the US1 Bridge. Total freshwater inflow to the Caloosahatchee Estuary decreased compared to last week and averaged 2,510 cfs with 1,340 (53%) coming from Lake Okeechobee. Salinity conditions in the upper estuary are suitable for tape grass. At the Cape Coral Bridge, salinity is in the fair range for adult oysters and is in the good range at the Shell Point and Sanibel monitoring stations. The 30-day average salinity at the I-75 Bridge is below 5 and forecast to remain so for the next two weeks.

Stormwater Treatment Areas

The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (May 1, 2015 – April 30, 2016) was approximately 238,500 acre-feet. Over the past week, the STAs/FEBs received approximately 7,500 acre-feet of Lake regulatory releases, and the total amount of Lake regulatory releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 8,300 acre-feet. Most STA cells are at or near target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-1W, STA-3/4 and STA-5/6 and structure repairs are underway in STA-1E. In addition, nests of ESA and/or MBTA-protected species have been observed in STA-1E, STA-1W and STA-2 as well as in STA-5/6. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E and A-1 FEB. A-1 FEB releases will be sent to STA-2 and STA-3/4.

Everglades

Water level changes this past week were mixed with Everglades National Park (ENP) experiencing increases that decreased the available habitat for the Cape Sable Seaside Sparrow. In the WCAs, water levels and recession have been mostly favorable for wading bird foraging, and large multi-species foraging flocks were witnessed this week. The 30-day moving average salinity at the Florida Bay MFL site remains low (4.6 psu compared to the average of 22 psu) and the cumulative inflow from the five creeks into Florida Bay is above the long-term average at 259,540 acre-feet. Florida Bay salinities are below average for this time of year, which are desirable and a restoration target.

Weather Conditions and Forecast

Dry through Thursday afternoon, then minor rains Thursday night through Saturday. Deep layered high pressure over the area will dominate our weather as it drifts eastward away from the District through tomorrow. Moisture will slowly increase this week as a weak upper level trough pushes into the area. Look for a few showers/isolated storms to form on Friday with this progression, then a few more showers with a trailing weak front on Saturday. Longer term, there are no obvious signs that the wet season would begin over the next ten days.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 3.73 inches of rainfall in the past week and the Lower Basin received 2.83 inches (SFWMD Daily Rainfall Report 05/09/2016).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 5/10/2016							Sunday Departure (feet)						
Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	5/8/16	5/1/16	4/24/16	4/17/16	4/10/16	4/3/16	3/27/16
Lakes Hart and Mary Jane	S62	122	LKMJ	60.0	R	60.0	0.0	-0.1	-0.2	-0.4	-0.4	-0.5	-0.3
Lakes Myrtle, Preston, and Joel	S57	47	S57	60.3	R	60.3	0.0	0.0	0.0	-0.1	0.0	0.0	0.4
Alligator Chain	S60	149	ALLI	62.7	R	62.6	0.1	-0.1	0.0	-0.1	0.0	0.0	0.4
Lake Gentry	S63	214	LKGT	60.1	R	60.1	0.0	0.0	0.0	0.9	0.4	-0.7	0.3
East Lake Toho	S59	389	TOHOE	56.6	R	55.9	0.7	0.3	0.1	-0.1	-0.1	-0.1	-0.1
Lake Toho	S61	1170	TOHOW, S61	53.7	R	52.9	0.8	0.3	0.1	0.0	0.0	0.4	0.4
Lakes Kissimmee, Cypress, and Hatchineha	S65	1091	LKISSP, KUB011, LKISSB	50.6	R	49.8	0.8	0.0	-0.1	0.0	-0.2	-0.2	-0.1

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A = not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 5/10/2016												
Metric	Location	Sunday's 1-day average	5/8/16	5/1/16	4/24/16	4/17/16	4/10/16	4/3/16	3/27/16	3/20/16	3/13/16	3/6/16
Discharge (cfs)	S-65	1346	1091	1125	1775	1812	3289	5062	1668	402	505	1313
Discharge (cfs)	S-65A	1377	1143	925	1656	1710	3395	5407	1461	280	408	1214
Discharge (cfs)	S-65C	1636	1337	1543	2082	2759	4387	2902	746	492	1237	2629
Headwater stage (feet NGVD)		34.3	34.3	34.0	34.1	34.0	34.0	34.1	34.0	34.1	34.2	34.9
Discharge (cfs)	S-65D****	1720	1391	1584	2132	2872	4648	2755	753	534	1375	2713
Discharge (cfs)	S-65E	1560	1268	1471	1983	2766	4507	2657	717	487	1360	2696
DO concentration (mg/L)***	Phase I river channel	5.93	5.94	5.65	4.84	3.82	3.12	3.83	5.74	5.98	5.98	5.36
Mean depth (feet)*	Phase I floodplain	0.80	N/A	0.57	0.94	1.08	1.76	2.32	0.70	0.48	0.52	1.12

* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

** Seven-day average of weighted daily means through Sunday midnight.

*** DO is the average for PC62 and PC33 starting June 2.PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

***** 1-day spacial average from field measurements in Pools A and BC

N/A Not applicable or data not available.

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
5/10/2016	No new recommendations.			
5/3/2016	No new recommendations.			
4/26/2016	No new recommendations.			
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			
3/29/2016	No new recommendations.			
3/22/2016	No new recommendations.			
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team
1/20/2016	Continue to adjust discharge at S65 to follow the 2015-16 Dry Season SR guidelines for rampdown at S65A. Balance discharge at the two structures to maintain at least minimum discharge to the river. As stage rises above 51 ft in KCH, temporarily bypass the Fig 1 discharge plan in the SR and manage discharge to let KCH stage rise to 51.5 ft (the Feb 1 recession starting stage) if conditions allow while following rampdown guidelines. If KCH stage rises further than 51.5 ft, we will reevaluate. As changes in discharge become necessary, continue to follow the Table 1 guidelines in the SR. Switch to Table 2 rampup/rampdown guidelines on Feb 1 or when the recession line is intercepted for management of the recession in KCH.	If conditions allow, let stage increase to 51.5 ft to intersect the Feb 1 starting stage for KCH F&W recession line.	Implemented	KB Tech Team
12/10/2015	Temporarily raise from 50.5 ft to 51 ft the threshold stage for increasing discharge at S65/S65A to 1400 cfs. This is a temporary modification of the current draft 2015-16 dry season Standing Recommendation (SR). Discontinue last week's temporary change in the rate of discharge increase and return to the original per-day rates shown in Table 1 of the draft SR - i.e., increase discharge to 1400 cfs at a rate of 150 cfs/day rather than 150 cfs/2 days. If KCH stage should start to decline while ramping up but before reaching 1400 cfs, begin to ramp back down using the rates in Table 1.	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/9/2015	Maintain ~300 cfs at S65/S65A until average stage in KCH rises to 51 ft. This is a temporary modification of the current draft dry season SR raising the stage threshold for discharge rampup from 50.5 ft to 51 ft. Once stage reaches 51 ft, begin increasing discharge at a rate of 150 cfs/day per Table 1 in the draft 2015-16 Dry Season SR. Discontinue the temporary guidance provided below (12/2/2015) and return to the original guidelines for rate of discharge rampup per Table 1 (150 cfs/day rather than 150 cfs/2 days).	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team

KCOL Hydrographs (through Sunday midnight)

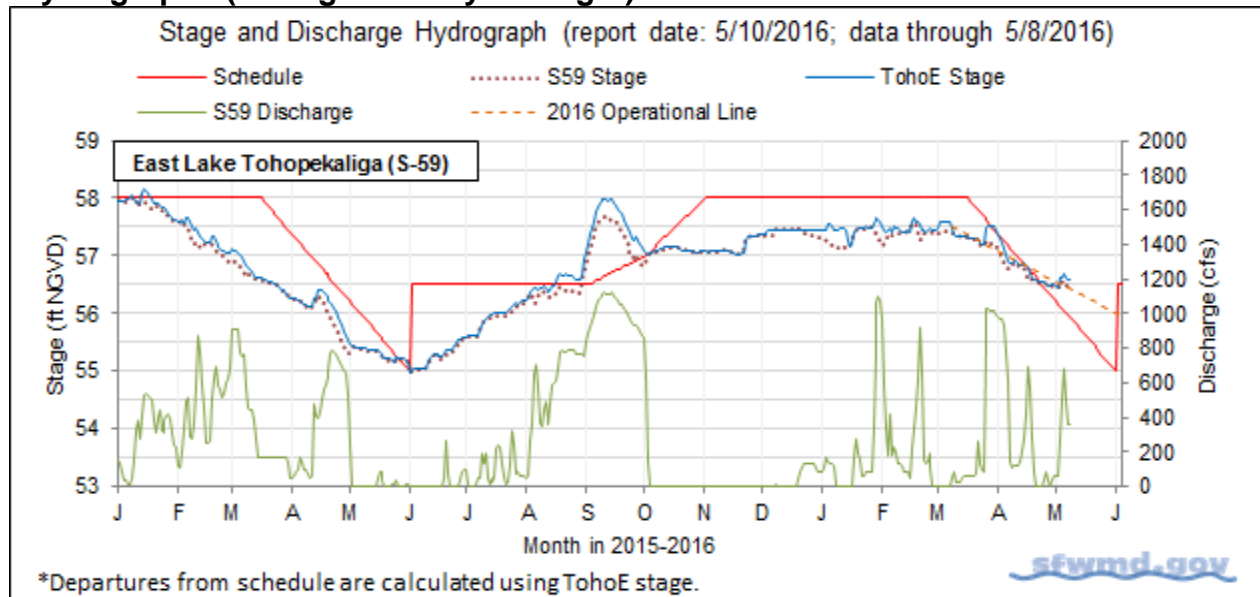


Figure 1.

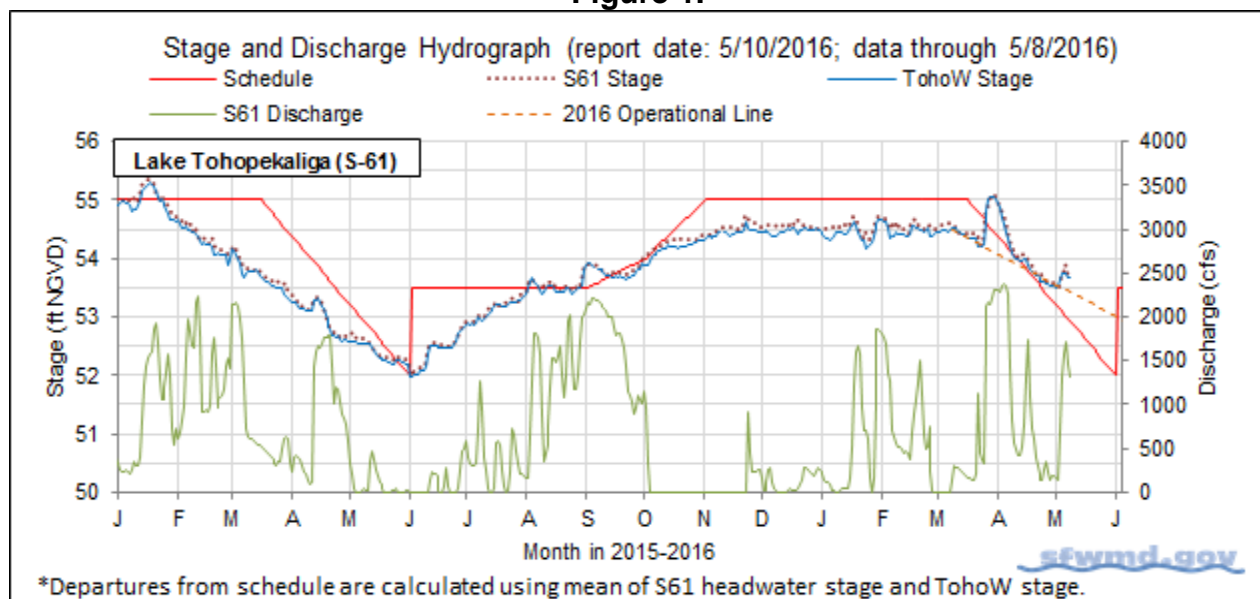


Figure 2.

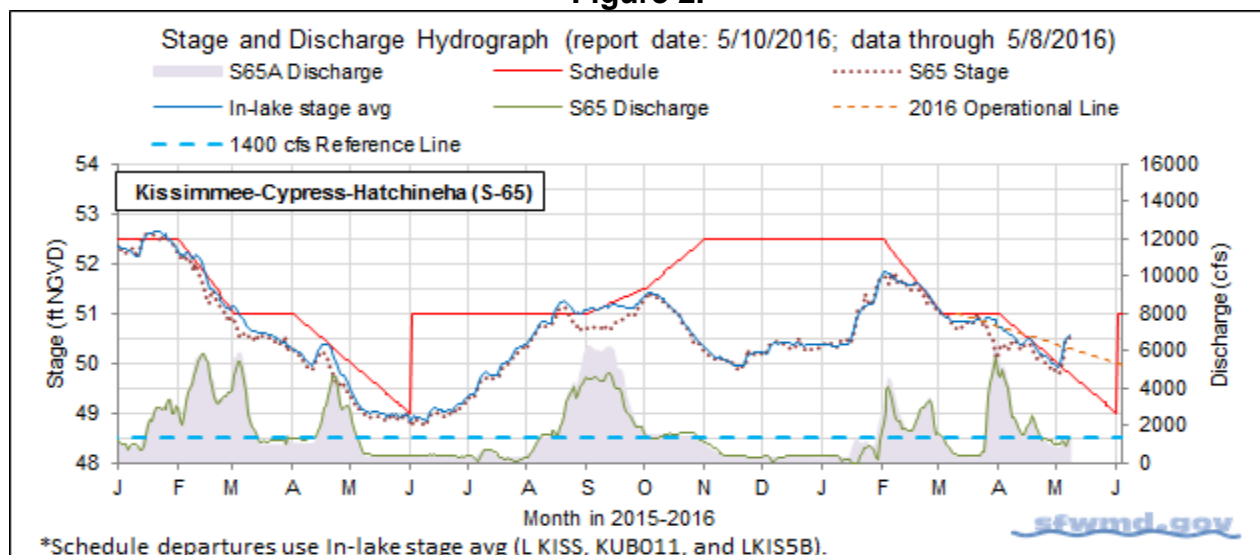


Figure 3.

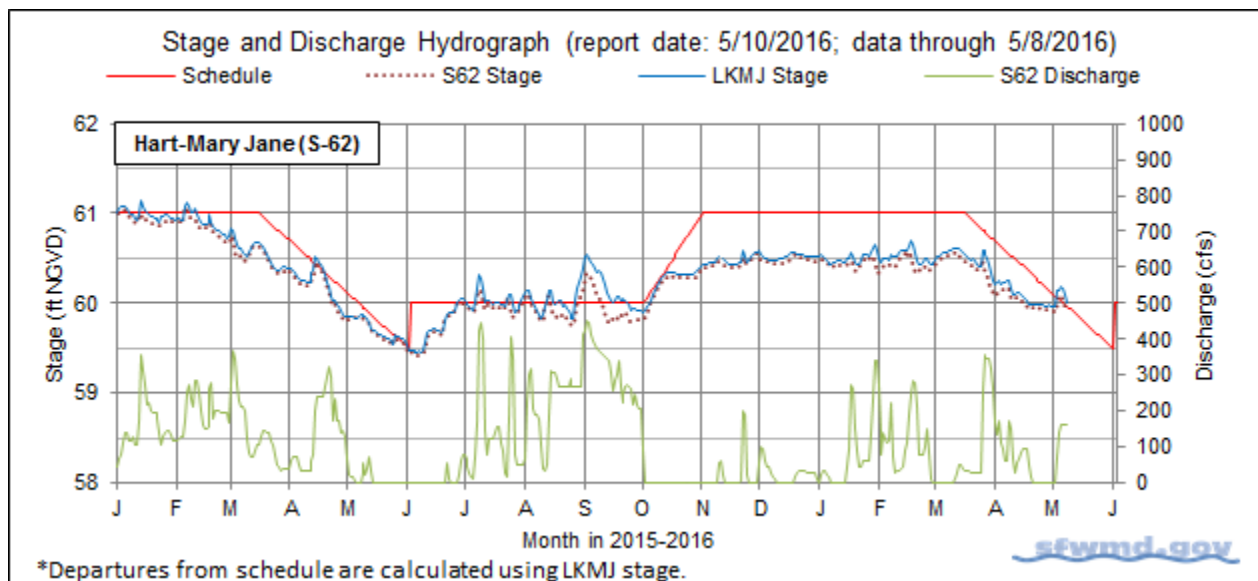


Figure 4.

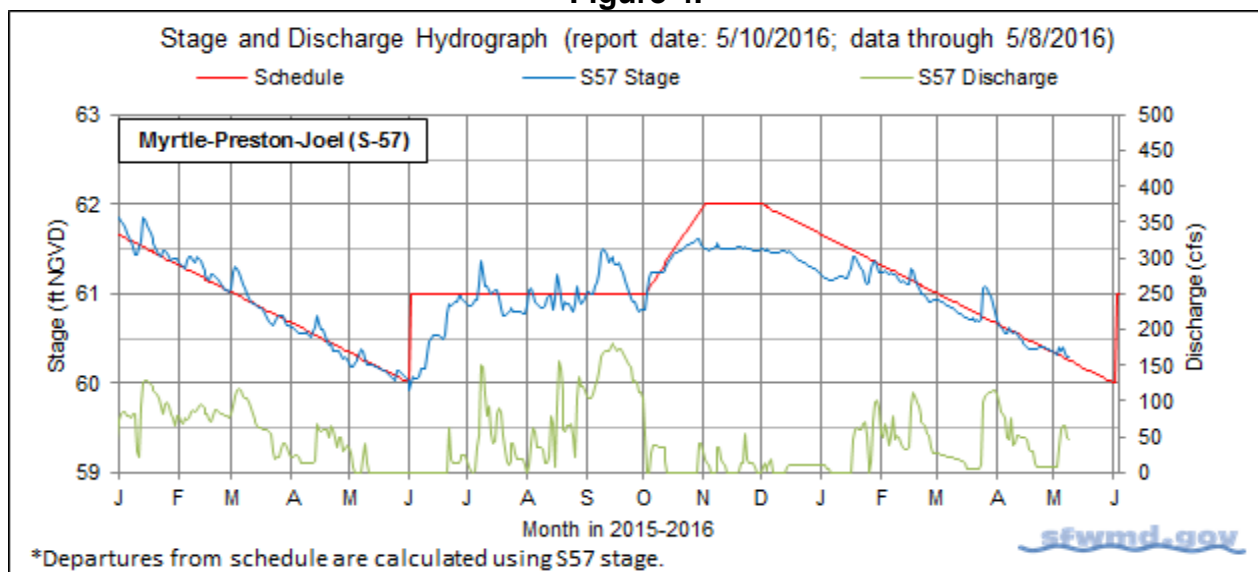


Figure 5.

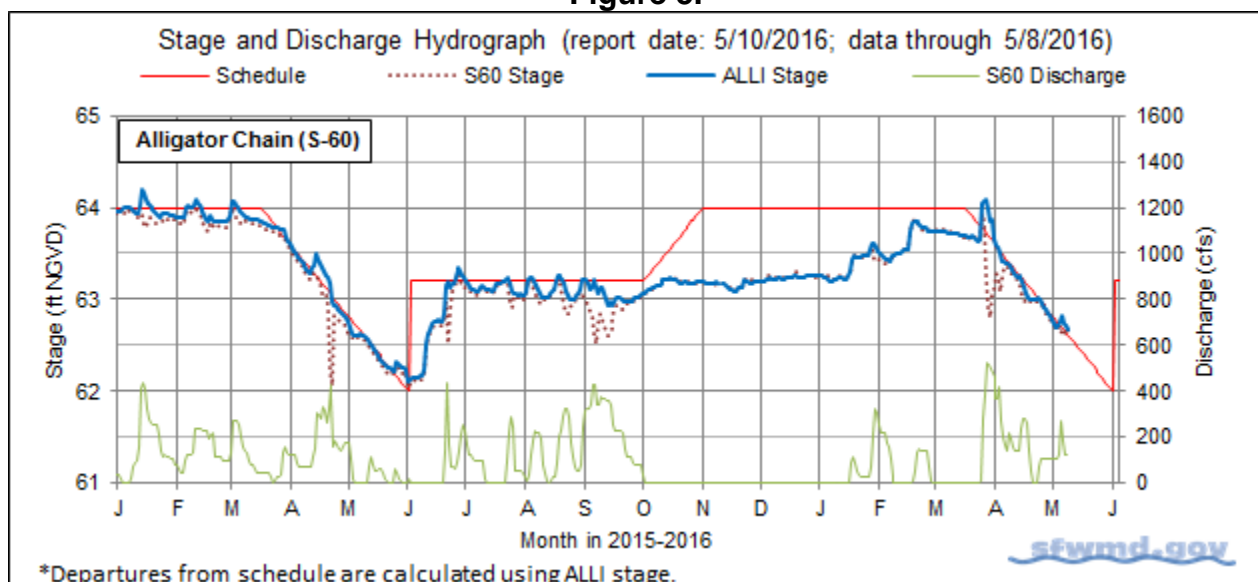


Figure 6.

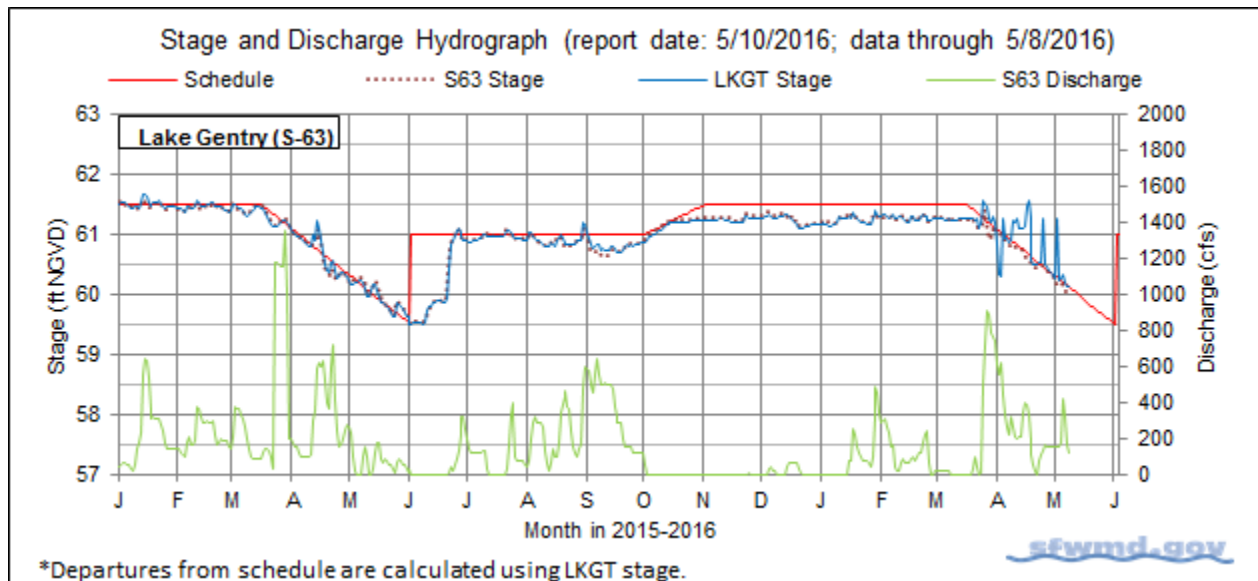


Figure 7.

Table 1. Discharge Rate of Change Limits for S65/S65A (Rate limits apply only in Zone B)			
	Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
Zone B	0-300	50	-50
	300-1400	150*	-75
	1400-2500	300	-300
	2500-3000	1000	-1000
Zone A	No limits		
*DRY FLOODPLAIN RULE. When the Kissimmee River floodplain is dry (>7 days at 300 cfs), increases above 1200 cfs should be made in consultation with LRE Operations (Steve Bousquin and David Anderson).			

Figure 8a. Limits on rate of discharge change at S65/S65A during F&W recession for dry season 2015-2016. Table 1 is from the 2015-2016 Dry Season Standing Recommendation.

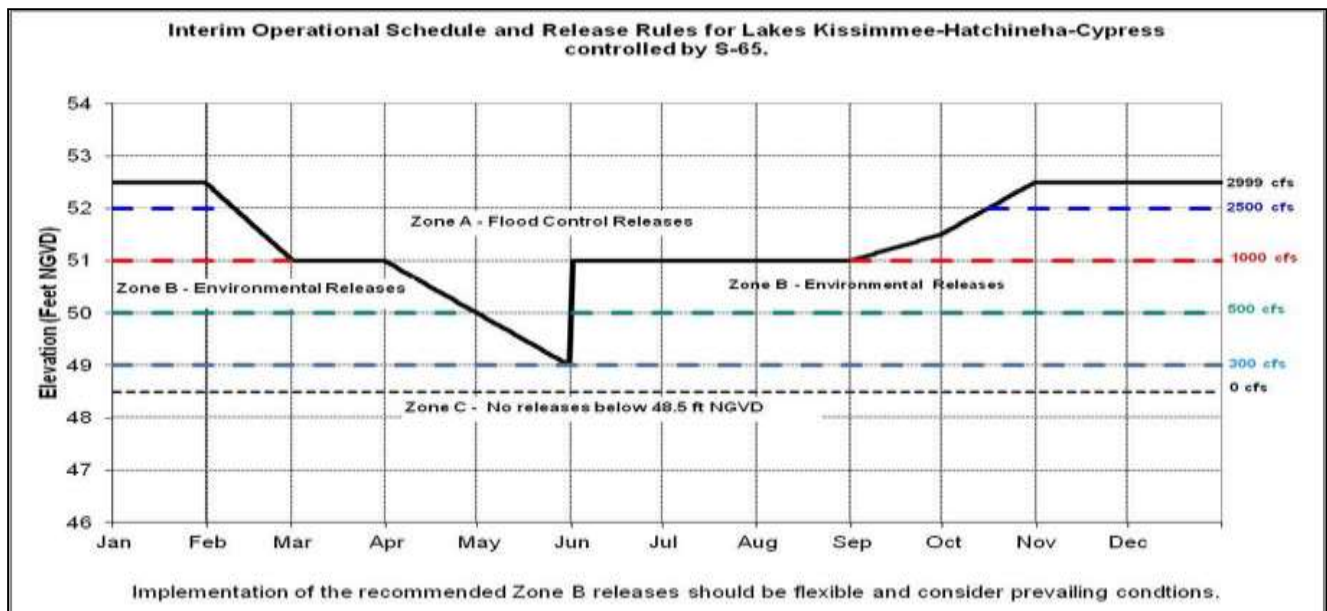


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

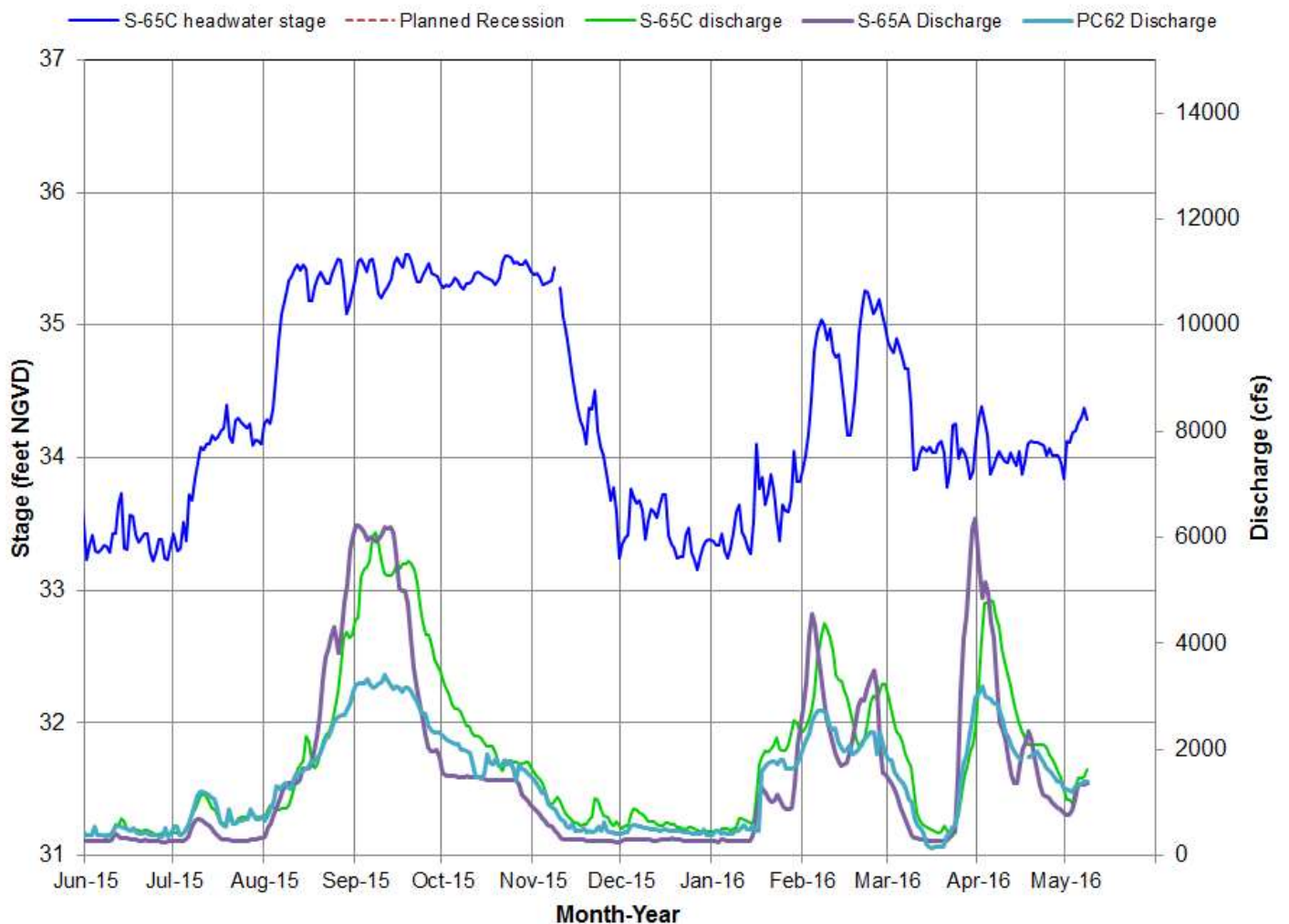


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

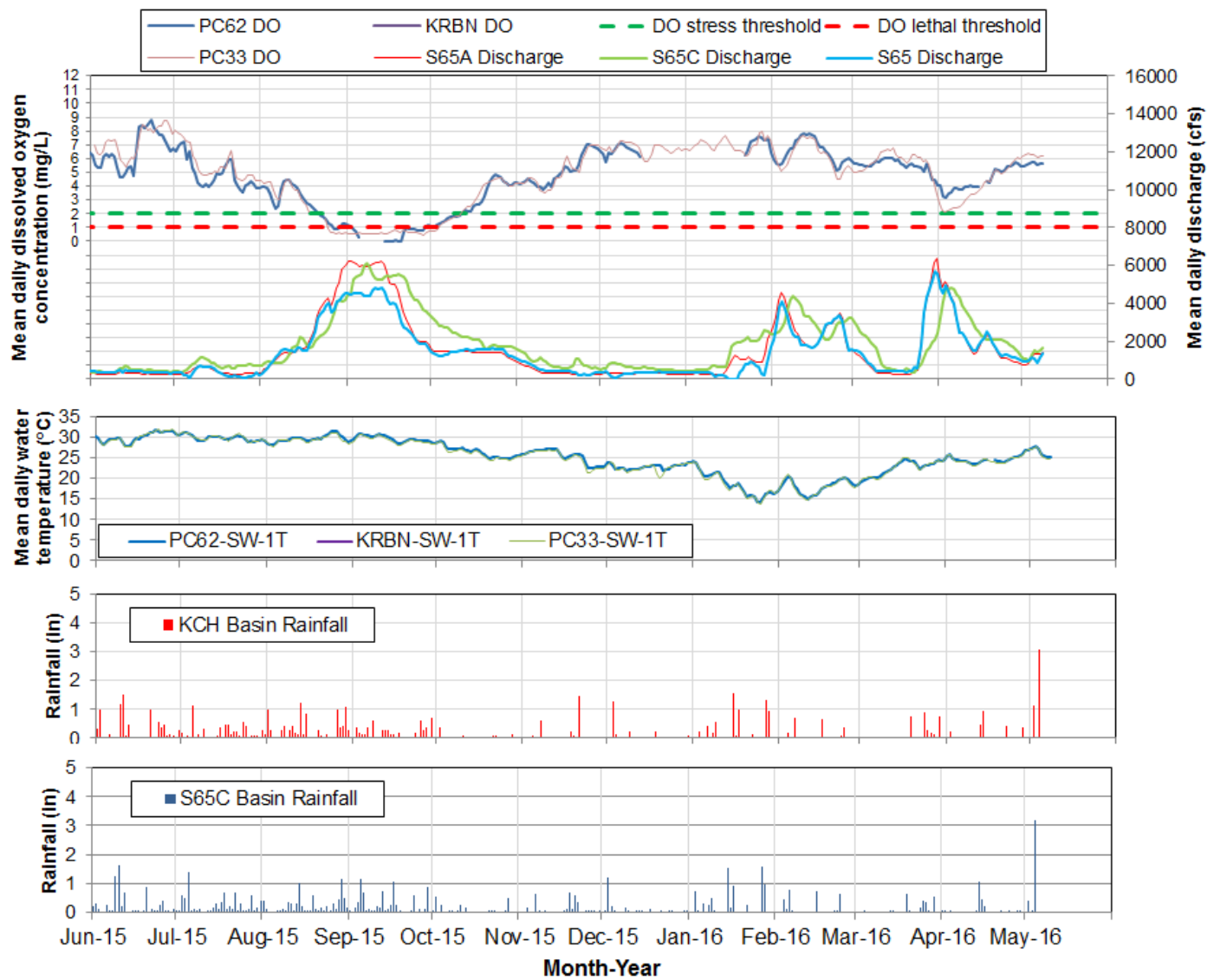


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

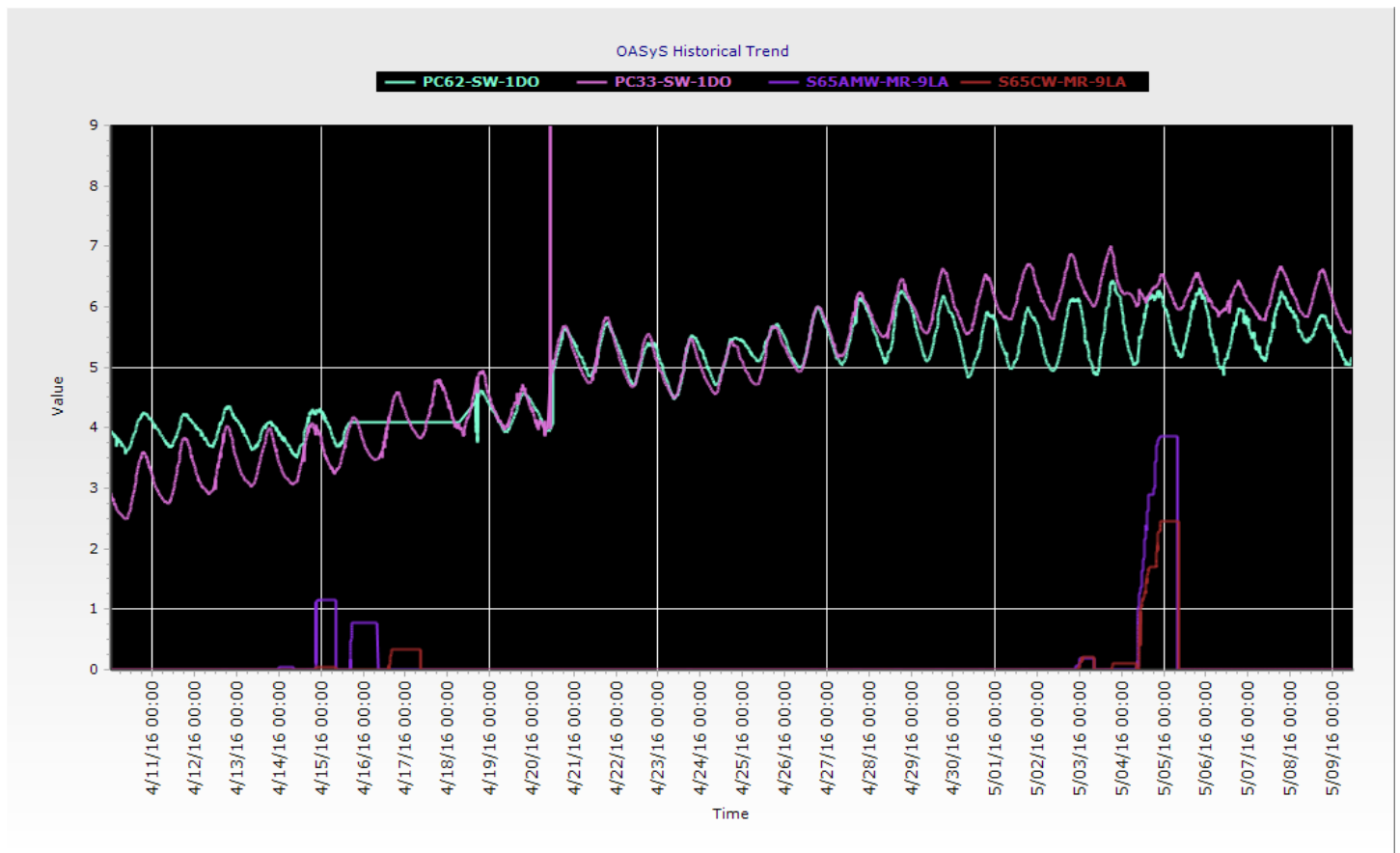


Figure 11. Phase I river channel dissolved oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

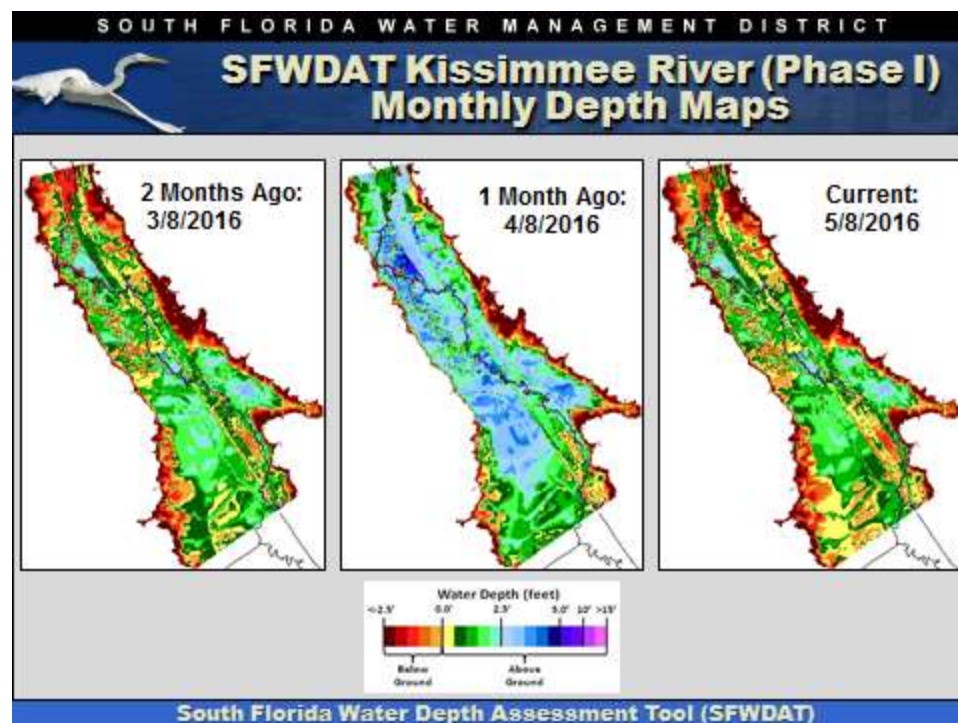


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs

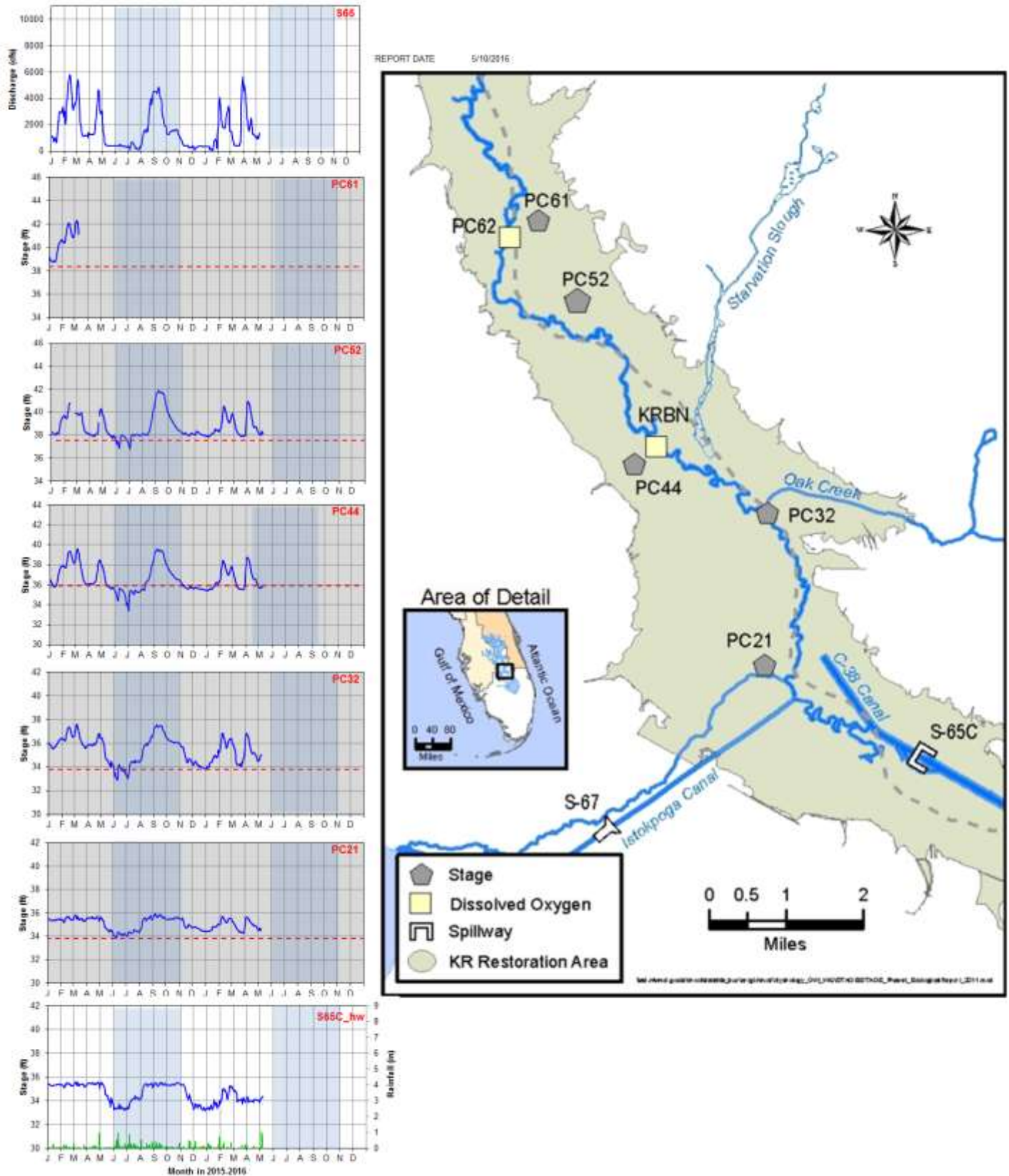


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

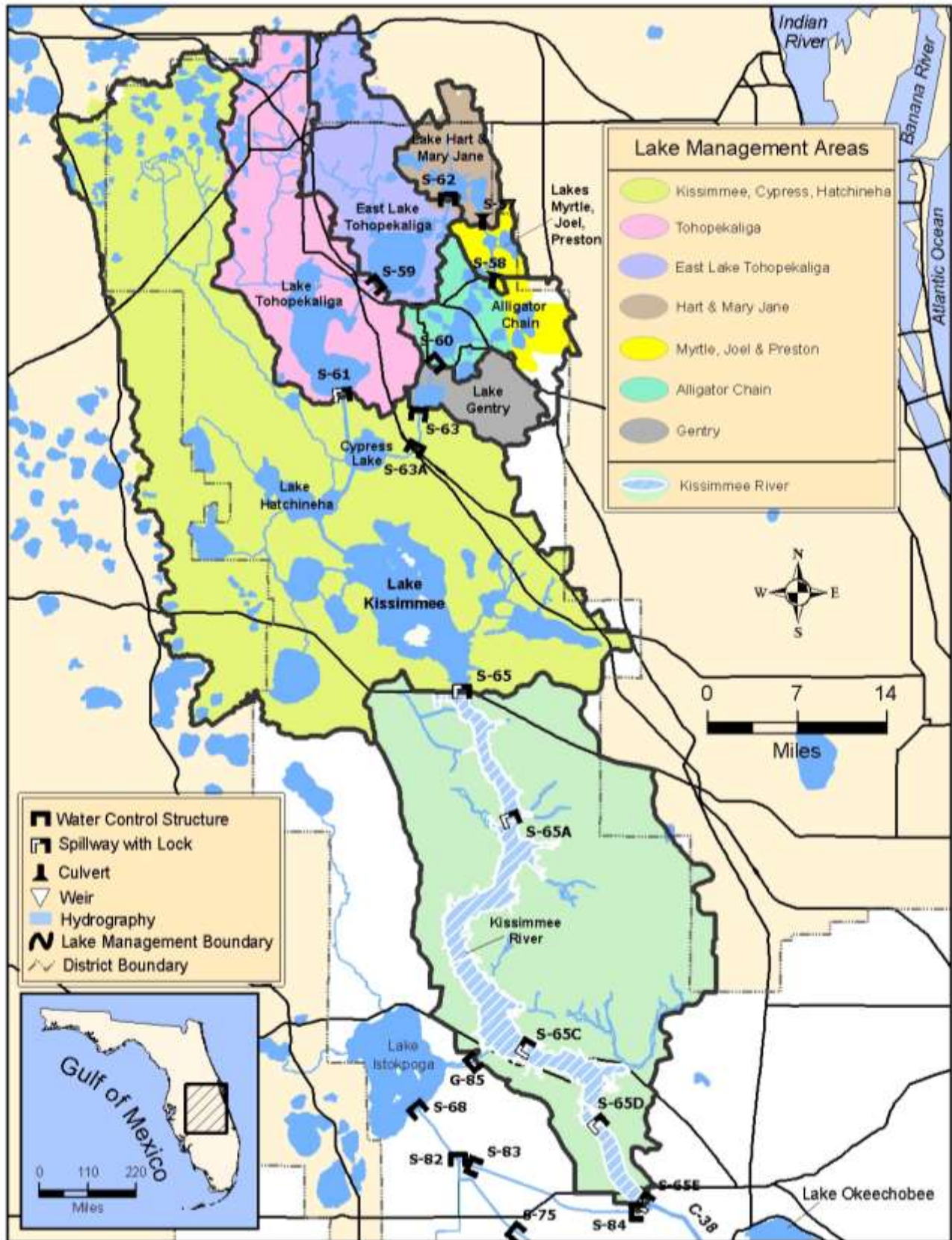


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 13.90 feet NGVD for the period ending at midnight on May 9, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage has decreased by 0.22 feet over the past week and is 1.04 feet lower than it was a month ago and 0.26 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINDAR, 0.48 inches of rain fell directly over the Lake during the past seven days. Similar or greater amounts of rain fell in the watershed (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 2,079 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	1,772
S154	0
S84 & 84X	279
S71	0
S72	0
C5 (Nicodemus slough dispersed storage)	-107
S191	40
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	95
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 5,105 cfs exiting at S77 (1,671 cfs), S308 (741 cfs), S351 (1,012 cfs), S354 (875 cfs), S352 (566 cfs) and to the L8 canal through Culvert C10A (240 cfs). Water supply demands have decreased somewhat in the EAA contributing to less water moving south. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 3,300 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 43,520 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 23,749 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5). On the May 5 wading bird survey, 16 wading bird flocks and 2,184 foraging birds were observed (Figure 6) continuing the trend of underutilization of the Lake as foraging habitat this season. However, nesting activity appears to be increasing, although outcomes of this breeding season will depend on whether the recession continues and when the rainy season and associated ascension in Lake stage begins.

The most recent MODIS satellite image for May 8 indicates that potential algal bloom conditions may exist in the central and southern portions of the pelagic region (Figure 7). The map to the left of the MODIS image displays an outlined area in the south end of the Lake where algal bloom conditions were observed on May 9 by District employees. Confirmatory water quality samples have been collected and results will be reported when available.

Water Management Recommendations

The winter/spring dry season recession is continuing with a decrease last week of 0.22 feet. The Lake stage decrease reflects the continuing difference between outflows and inflows with a small increase in tributary inflows this past week, a small increase in discharges east of the Lake and the seasonally high evapotranspiration rate. Future short-term recommendations are highly dependent on the near-term rainfall patterns and amounts. Actions, which contribute to continuing the recession, are essential to position the Lake for the wet season ascension. The goal is to avoid reversals and maintain a steady recession in Lake stage to achieve an end of dry season elevation as close to 12.5 feet NGVD as possible at the end of the dry season. The current recession rate is probably beneficial to Lake fauna such as snail kites and wading birds although it may be too fast for apple snails due to the potential to strand adults and dry the marsh under developing egg clutches.

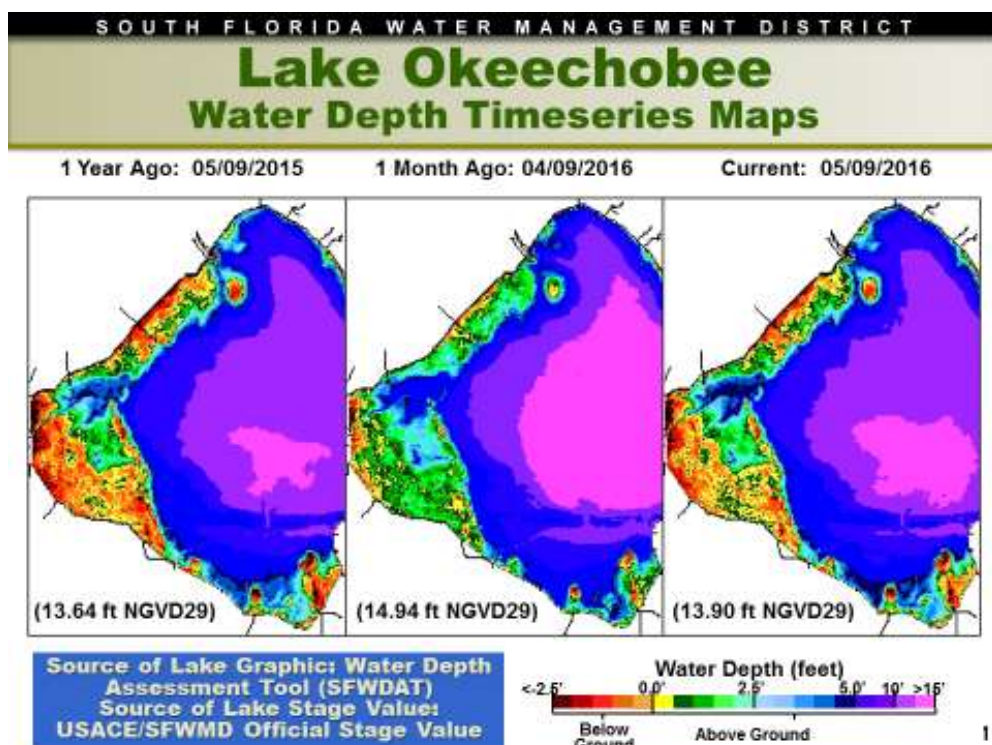


Figure 1

Lake Okeechobee Water Level History and Projected Stages

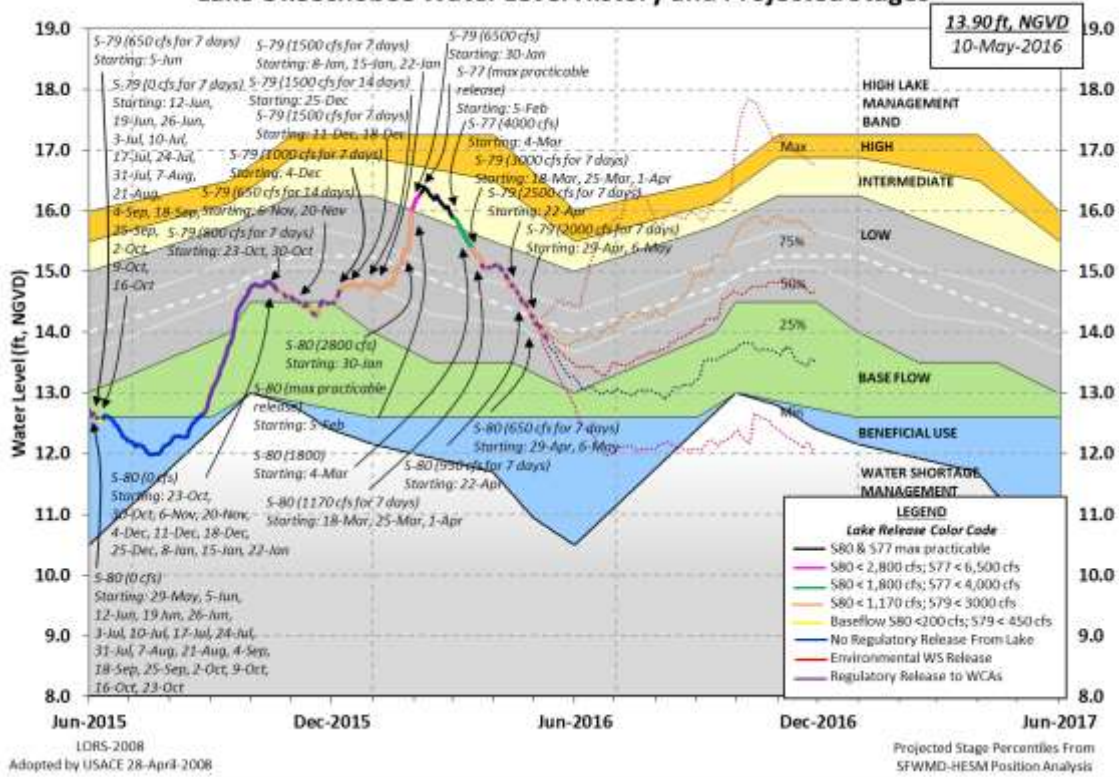


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0215 EST, 05/03/2016

THROUGH: 0215 EST, 05/10/2016

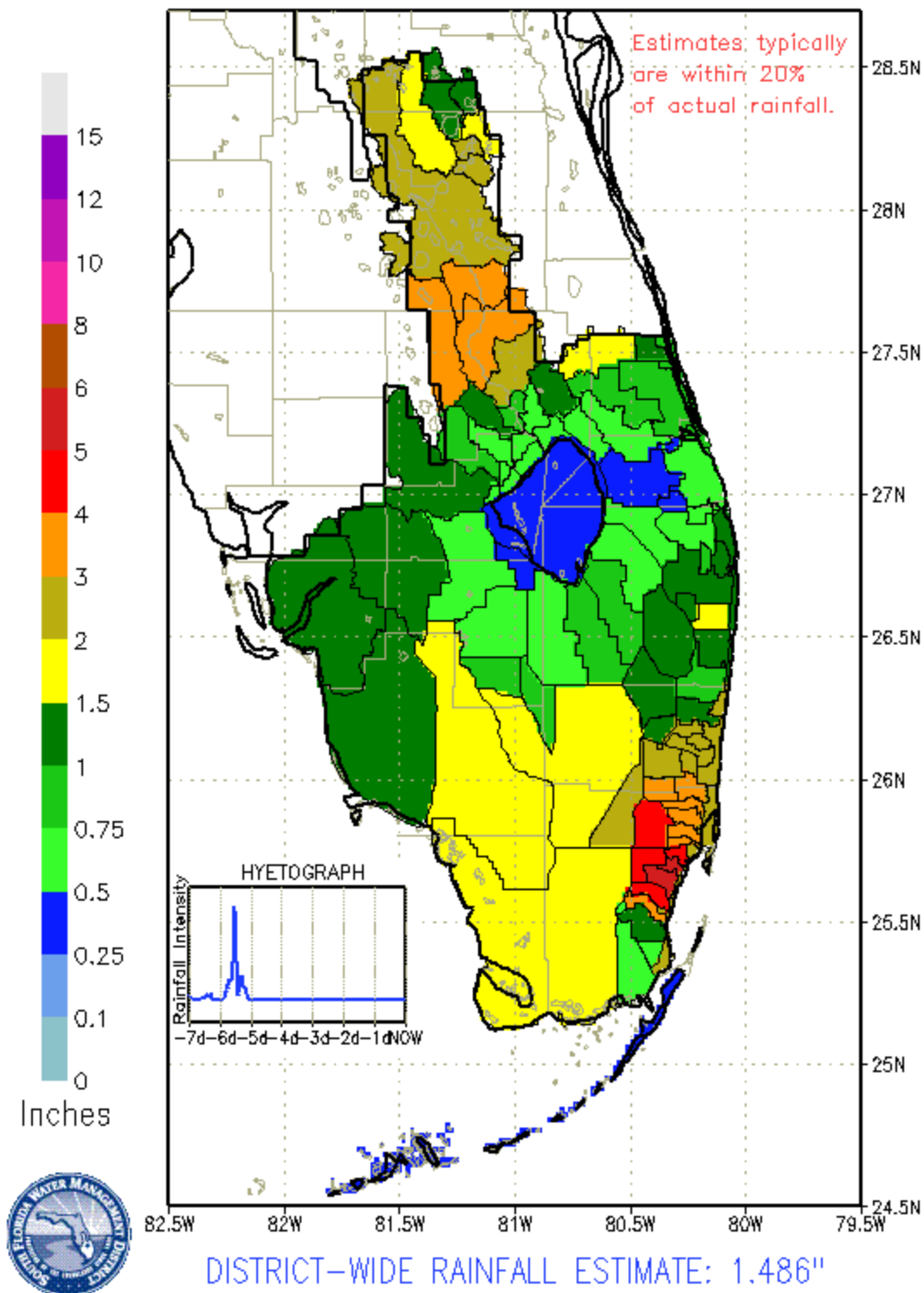


Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	1351	0.047
S71 & 72	0	0.000
S84 & 84X	123	0.004
Fisheating Creek	162	0.006
Rainfall	N.A.	0.040
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	1420	0.049
S308	575	0.020
S351	689	0.024
S352	513	0.018
S354	727	0.025
L8	328	0.011
ET	3300	0.114

Figure 4

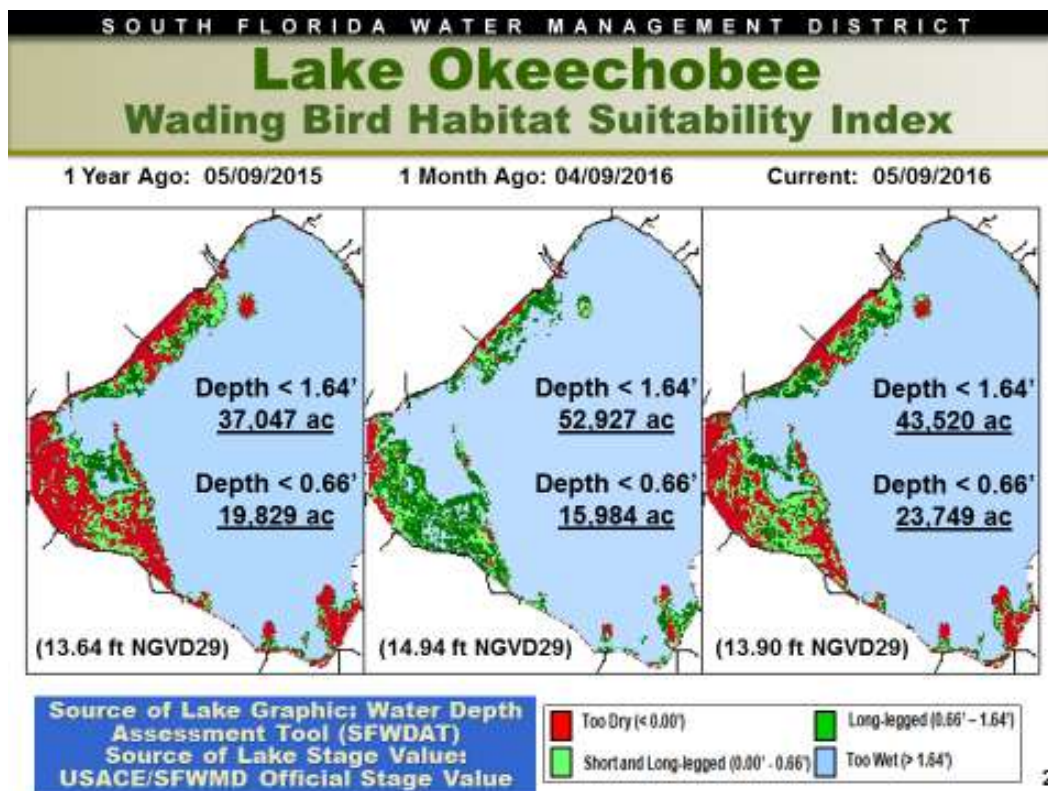


Figure 5

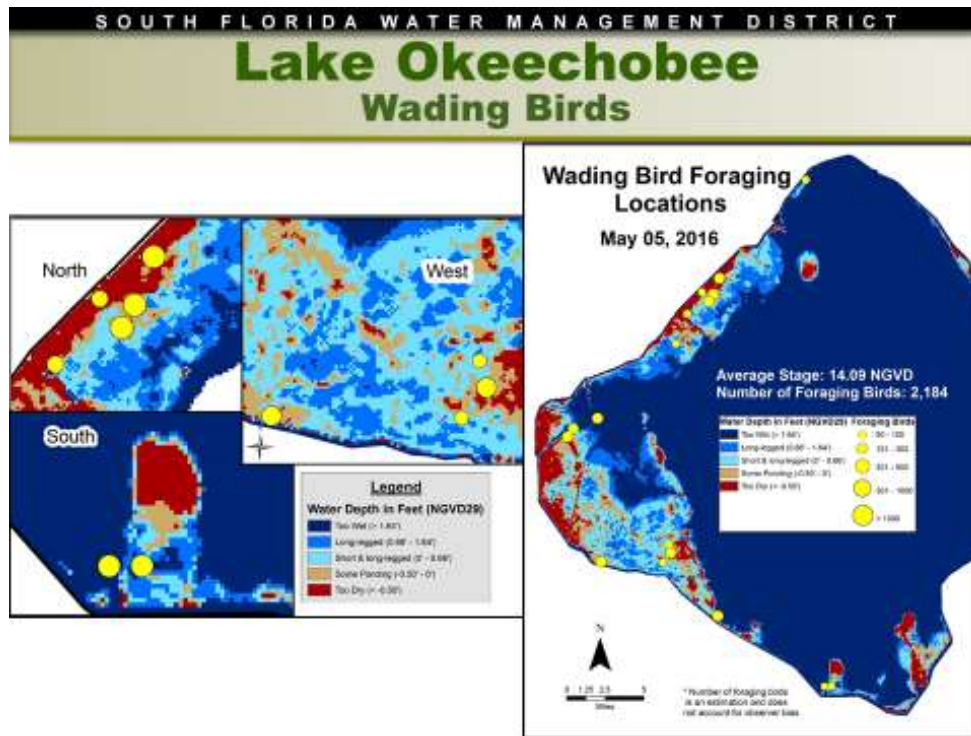


Figure 6



Unvalidated and Experimental Data

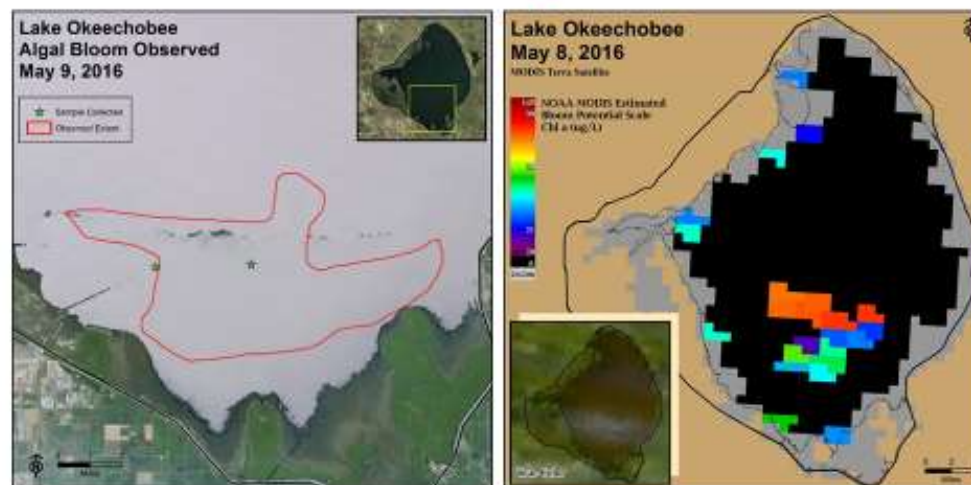


Figure 7

Lake Istokpoga

A reversal occurred last week with Lake stage increasing by 0.18 feet. Lake Stage is 38.80 feet NGVD today and is currently 0.08 feet above its regulation schedule of 38.72 feet NGVD (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were 320 and 37 cfs respectively, a large increase from the preceding week. Average discharge from S68 and S68X this past week was 203 cfs, an increase compared to the preceding week. According to RAINДАР, 3.15 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

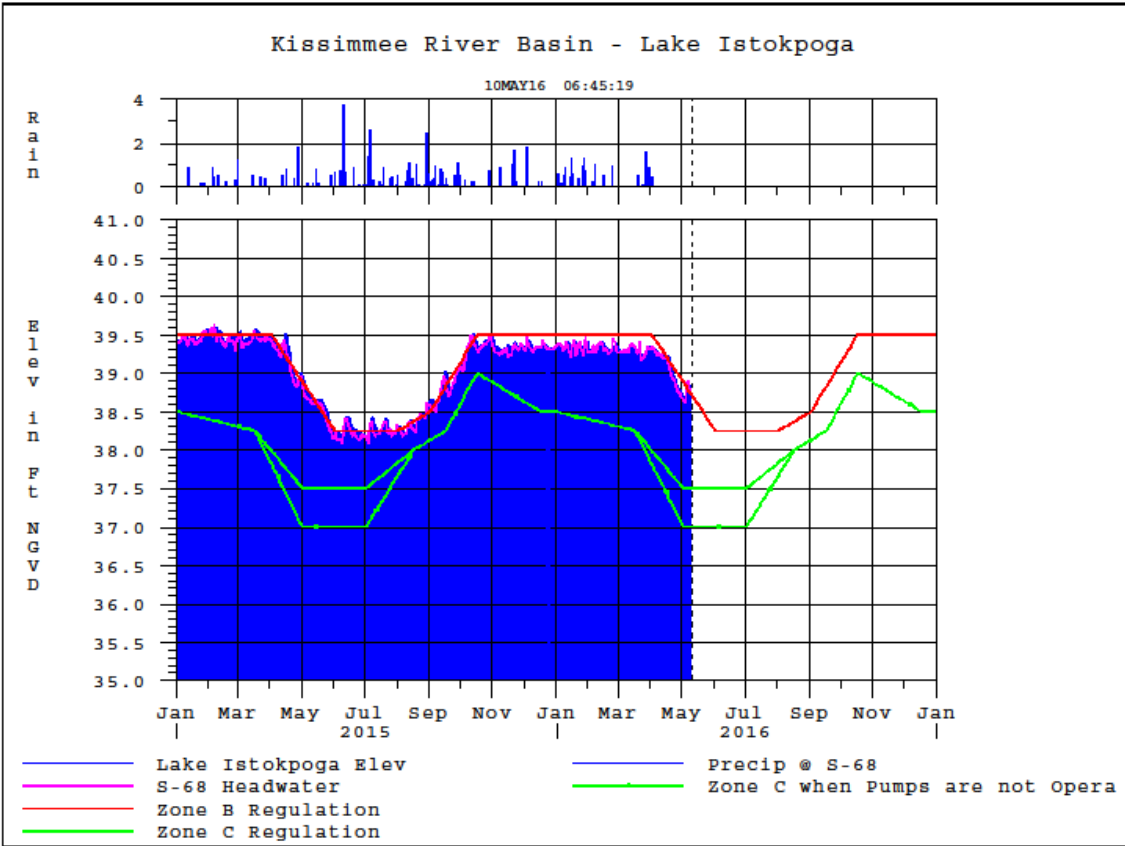


Figure 8

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 656 cfs at S-80, 575 cfs downstream of S-308, 34 cfs at S-49 on C-24, 14 cfs at S-97 on C-23, and 79 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 188 cfs (Figures 1 and 2). Total inflow averaged about 971 cfs last week and 1,350 cfs over last month.

Over the past week, salinity increased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 13. Salinity conditions in the middle estuary are in the good range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	7.3 (4.1)	11.8 (5.9)	NA ¹
US1 Bridge	11.5 (7.3)	14.5 (10.3)	10.0-26.0
A1A Bridge	20.9 (17.0)	25.9 (24.8)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 1,420 cfs downstream of S-77, 1,631 cfs at S-78, and 2,255 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 255 cfs (Figures 5 and 6). Total inflow averaged 2,510 cfs last week and 2,732 cfs over last month.

Over the past week, salinity remained about fresh in the upper estuary from S-79 to Ft. Myers Yacht Basin and decreased downstream (Table 2, Figures 7 & 8). The seven-day average salinity values are within the good range for adult oysters at Shell Point and at Sanibel and in the fair range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.3 at Val I-75 and 0.7 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass, and are forecasted to remain so in following two weeks even without discharges at S-79 (Figure 10).

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I75	0.3 (0.3*)	0.3* (0.6*)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.6 (1.0)	0.7 (2.2)	NA
Cape Coral	7.7 (7.8)	8.7 (11.4)	10.0-30.0
Shell Point	19.7 (22.1)	23.0 (24.9)	10.0-30.0
Sanibel	28.0 (30.4)	28.6 (31.1)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average.

*Val I75 is temporarily offline due to bridge construction,
Salinity values are estimated using models developed for this sites.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	Not reporting	3.2 – 8.2	1.7 – 7.5
Dissolved Oxygen (mg/l)	Not reporting	5.2 – 9.3	5.4 – 7.3

The Florida Fish and Wildlife Research Institute reported on May 6, 2016, that *Karenia brevis*, the Florida red tide organism, was not present in samples collected in Lee County.

Water Management Recommendations

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

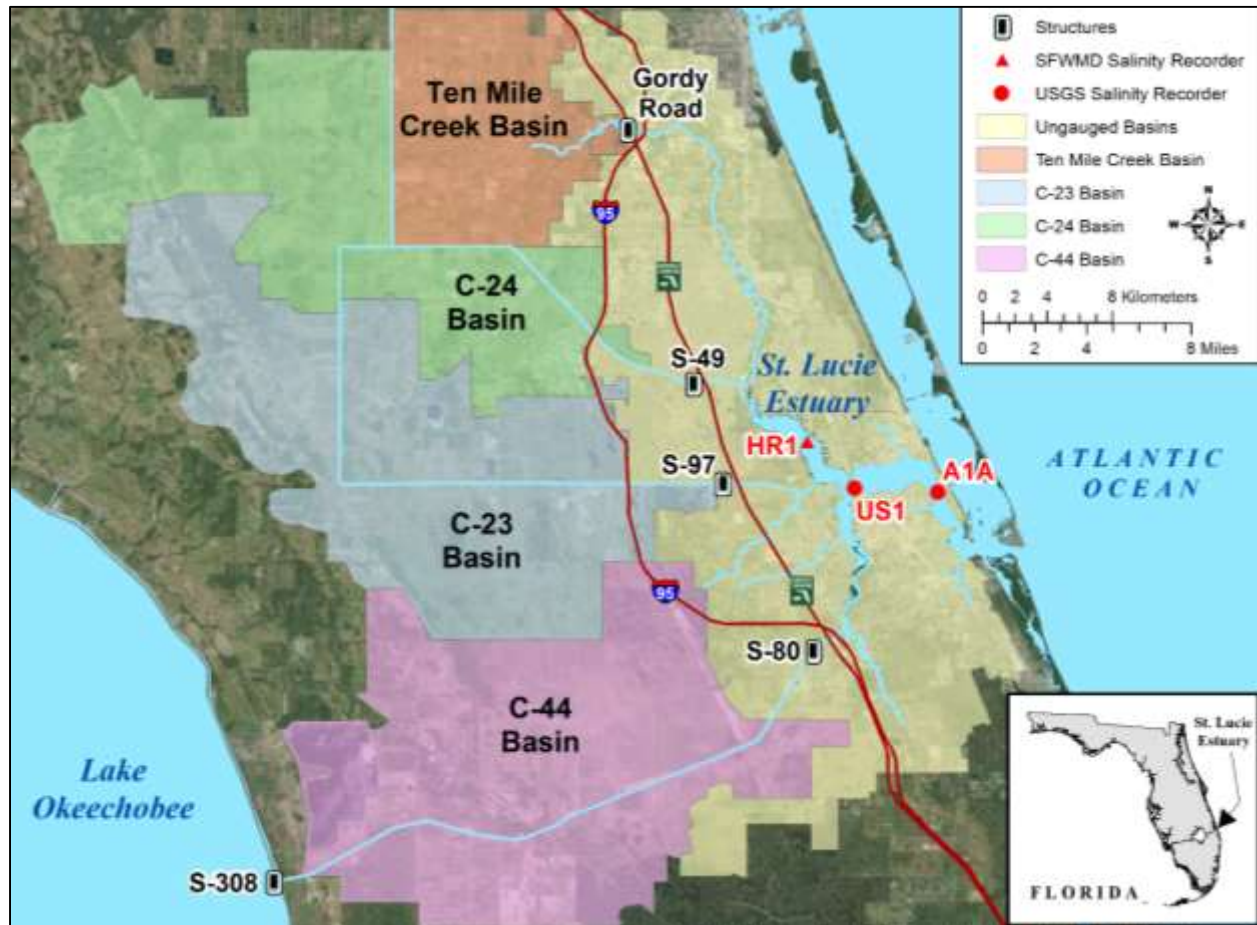


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

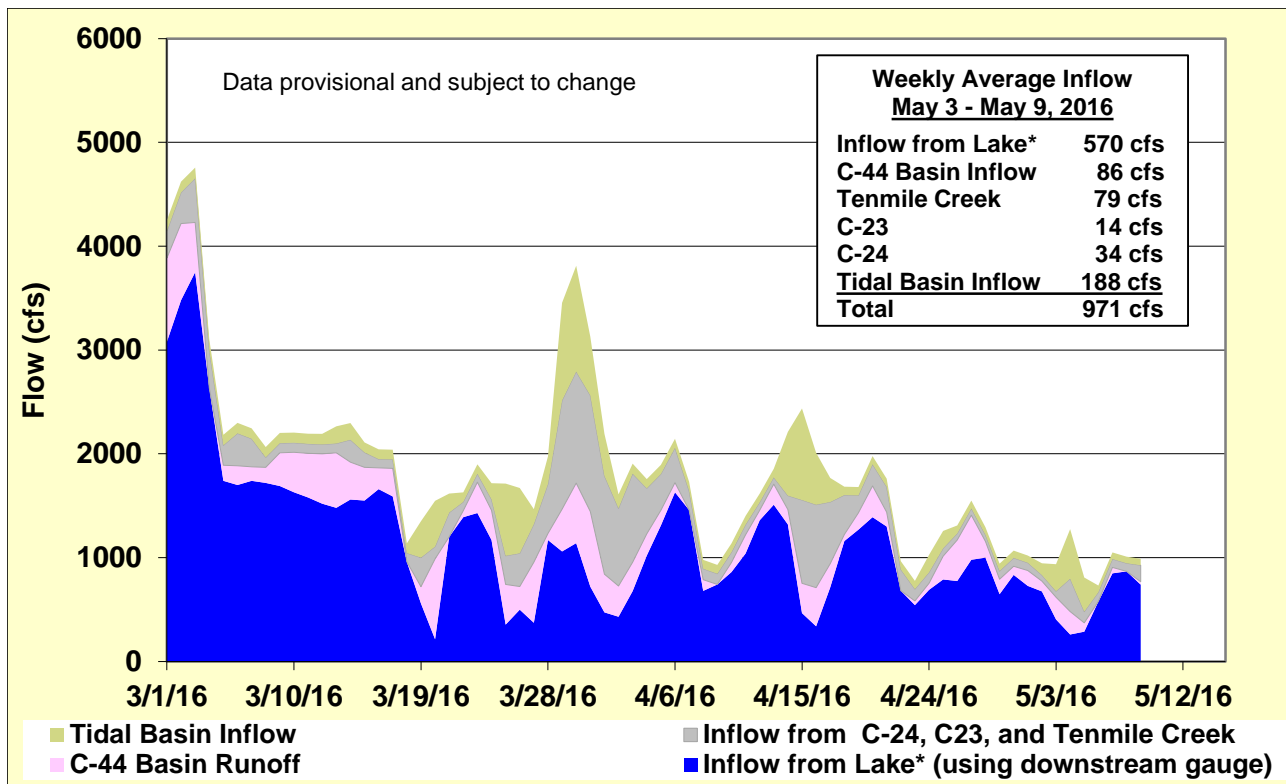


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

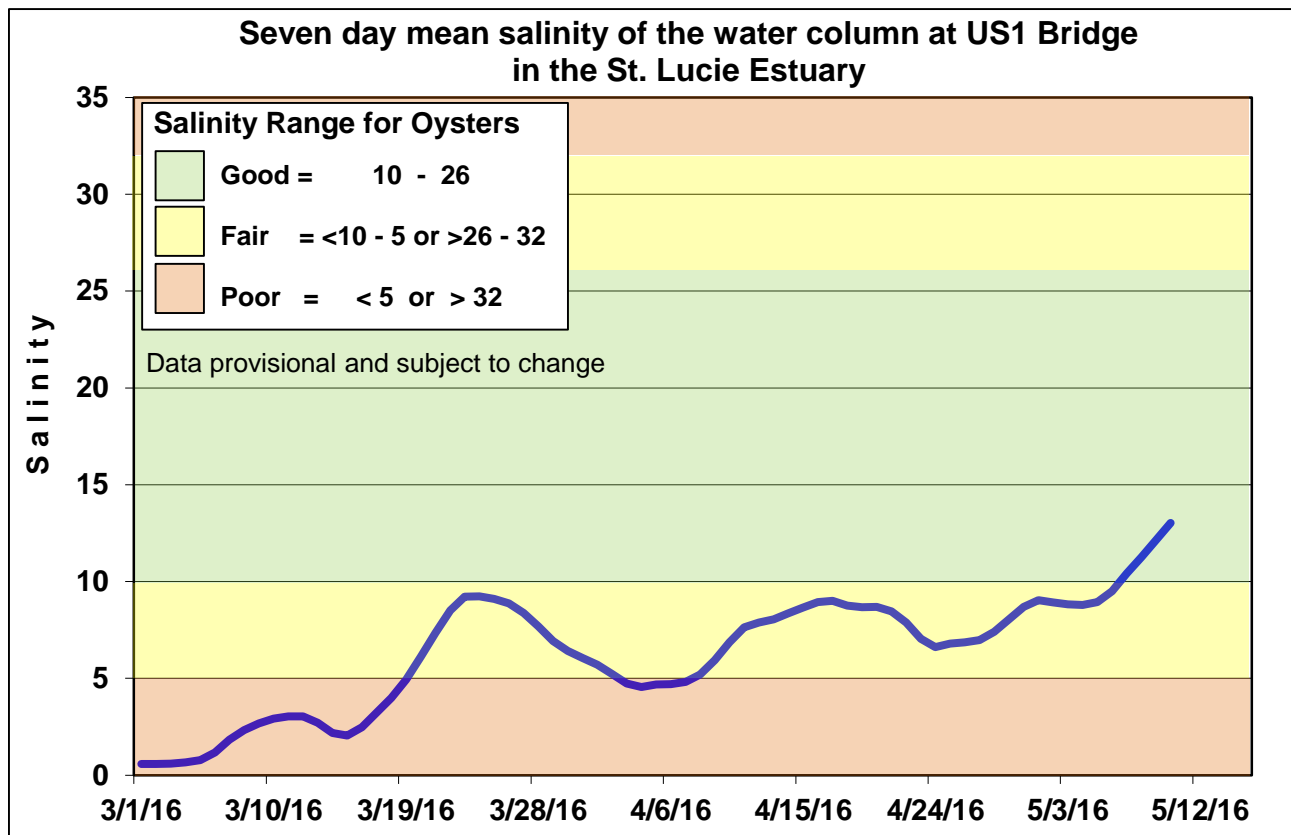


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

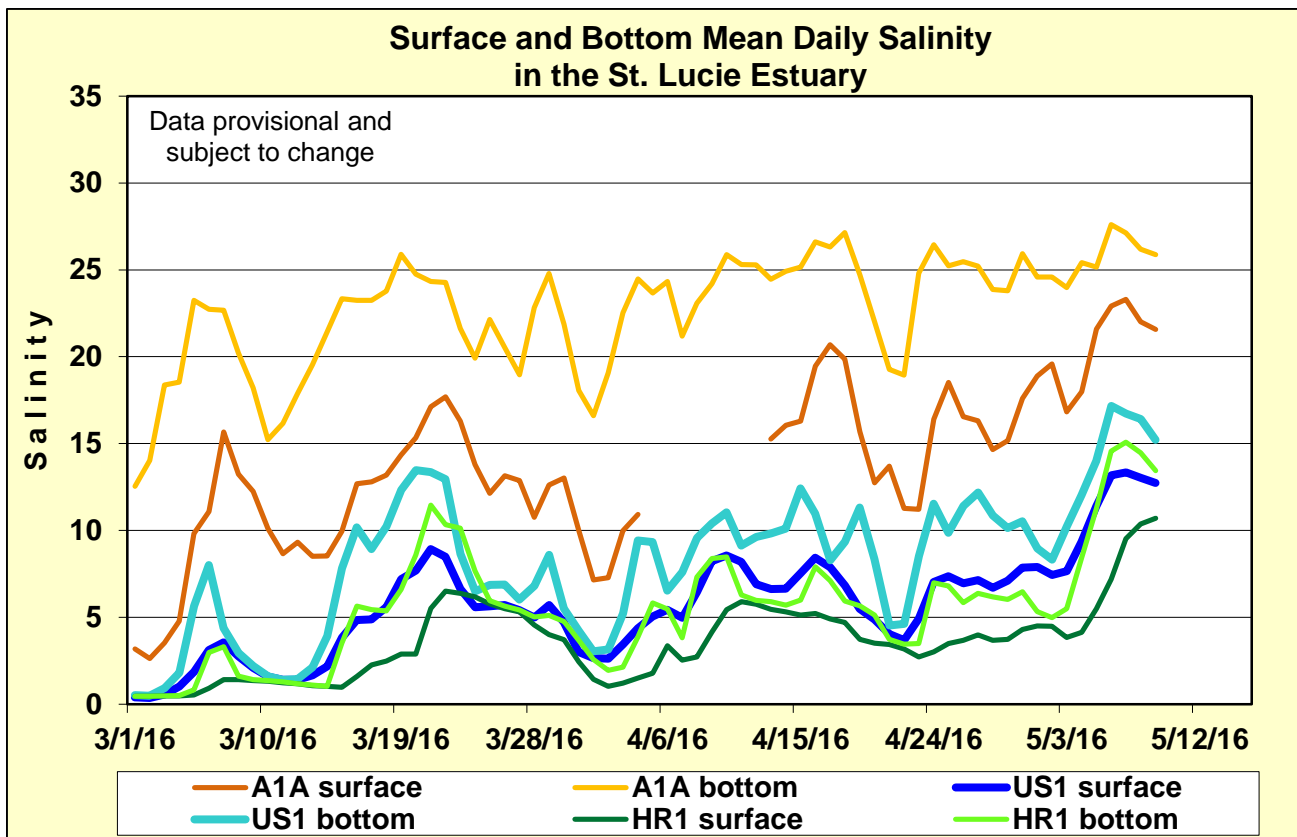


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

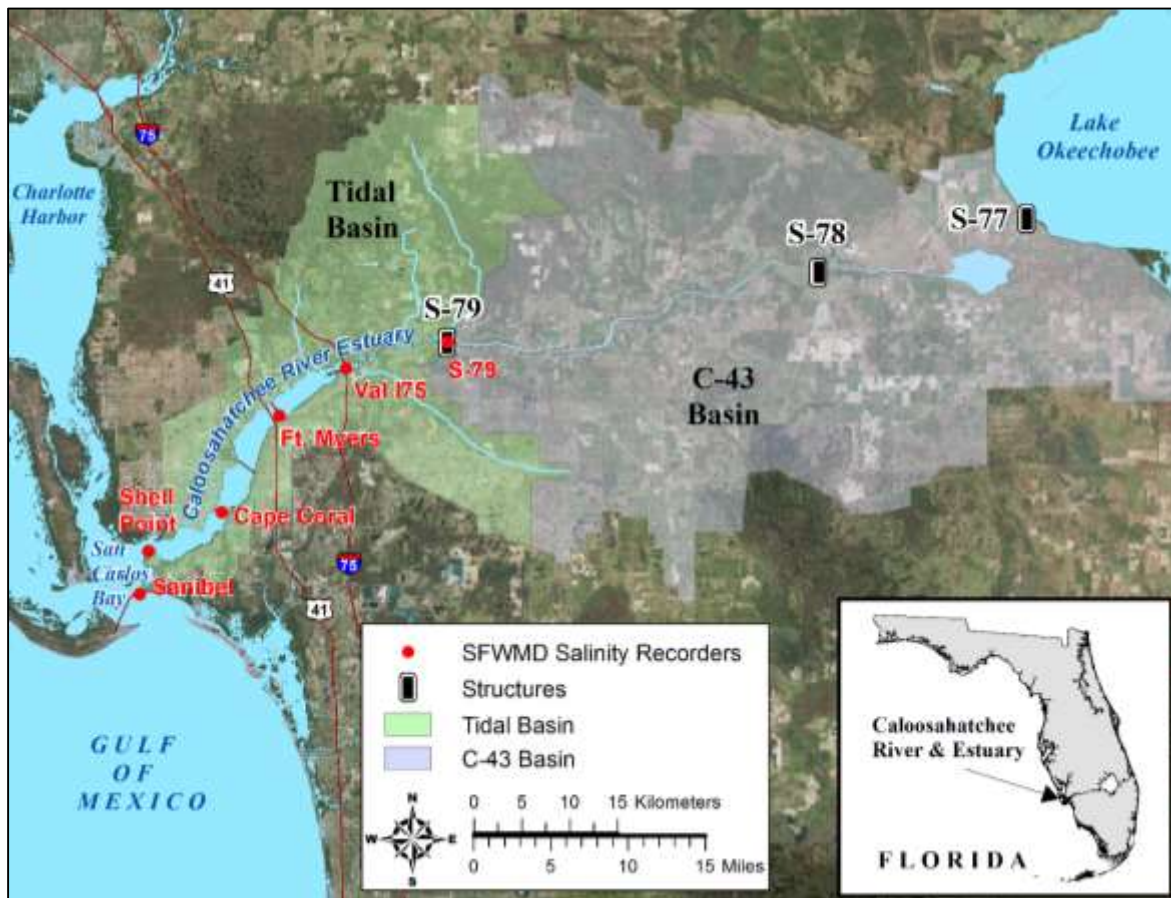


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

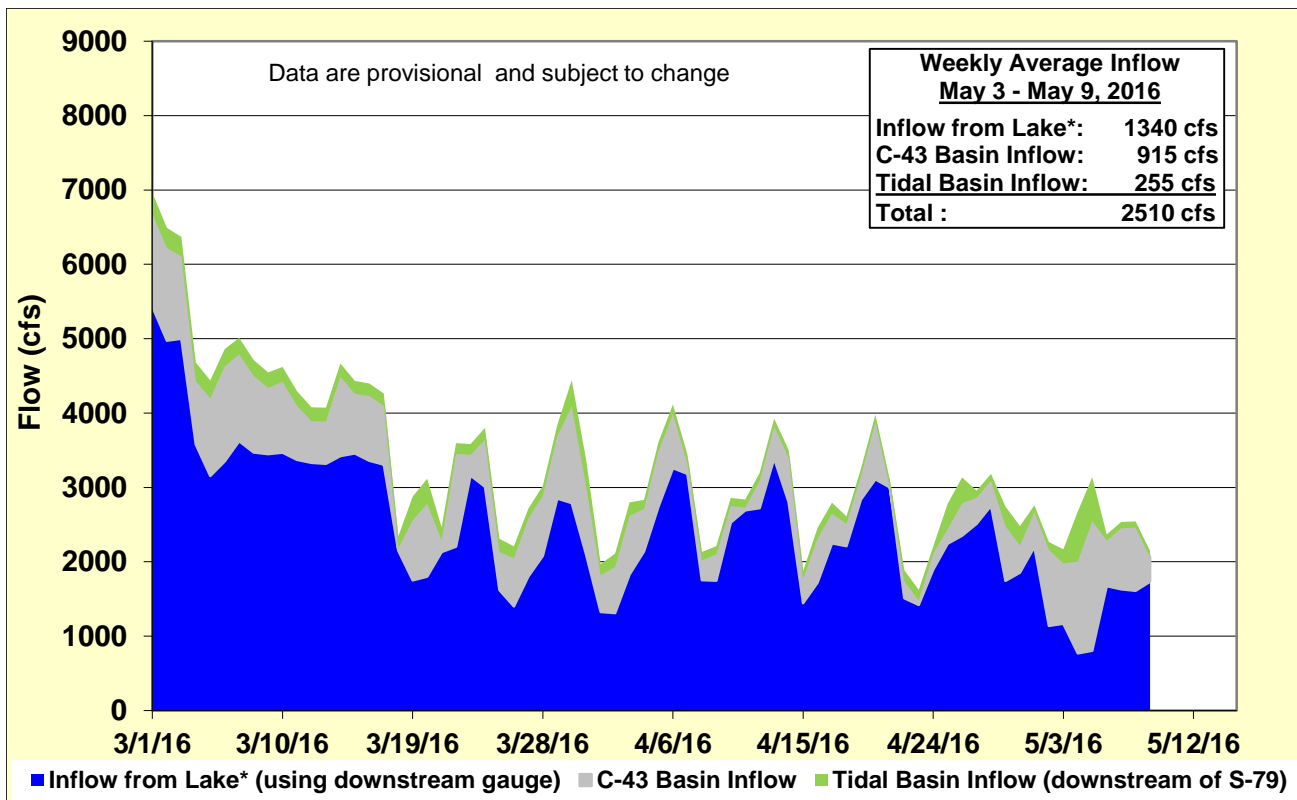
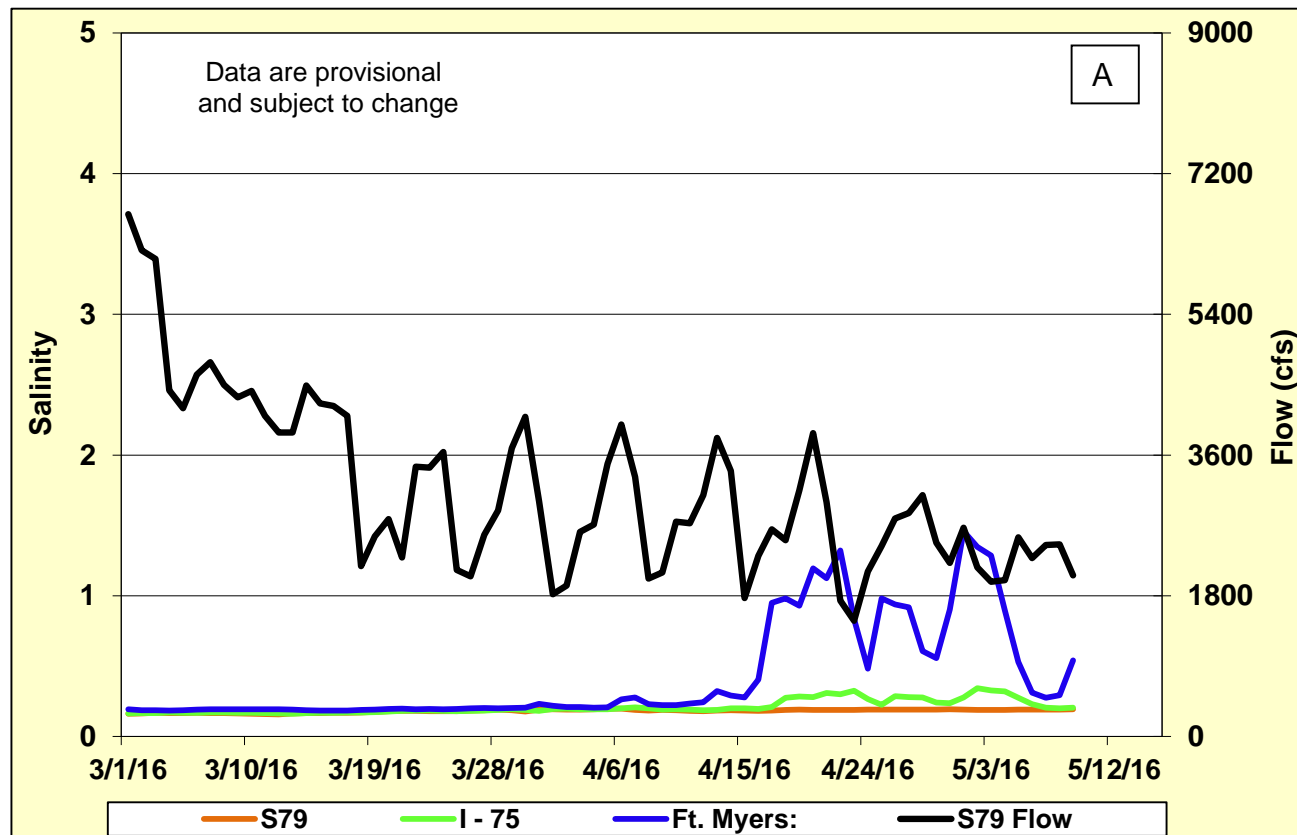


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



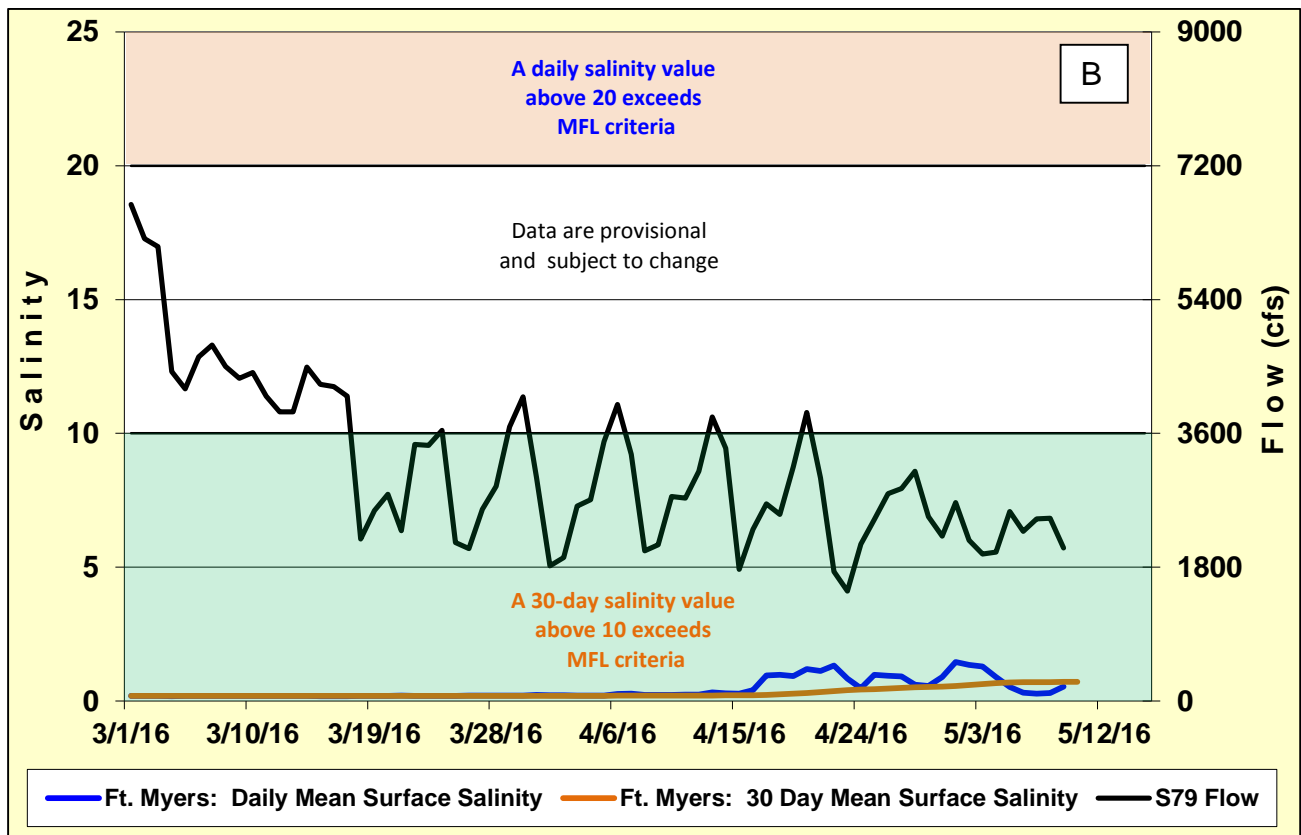


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

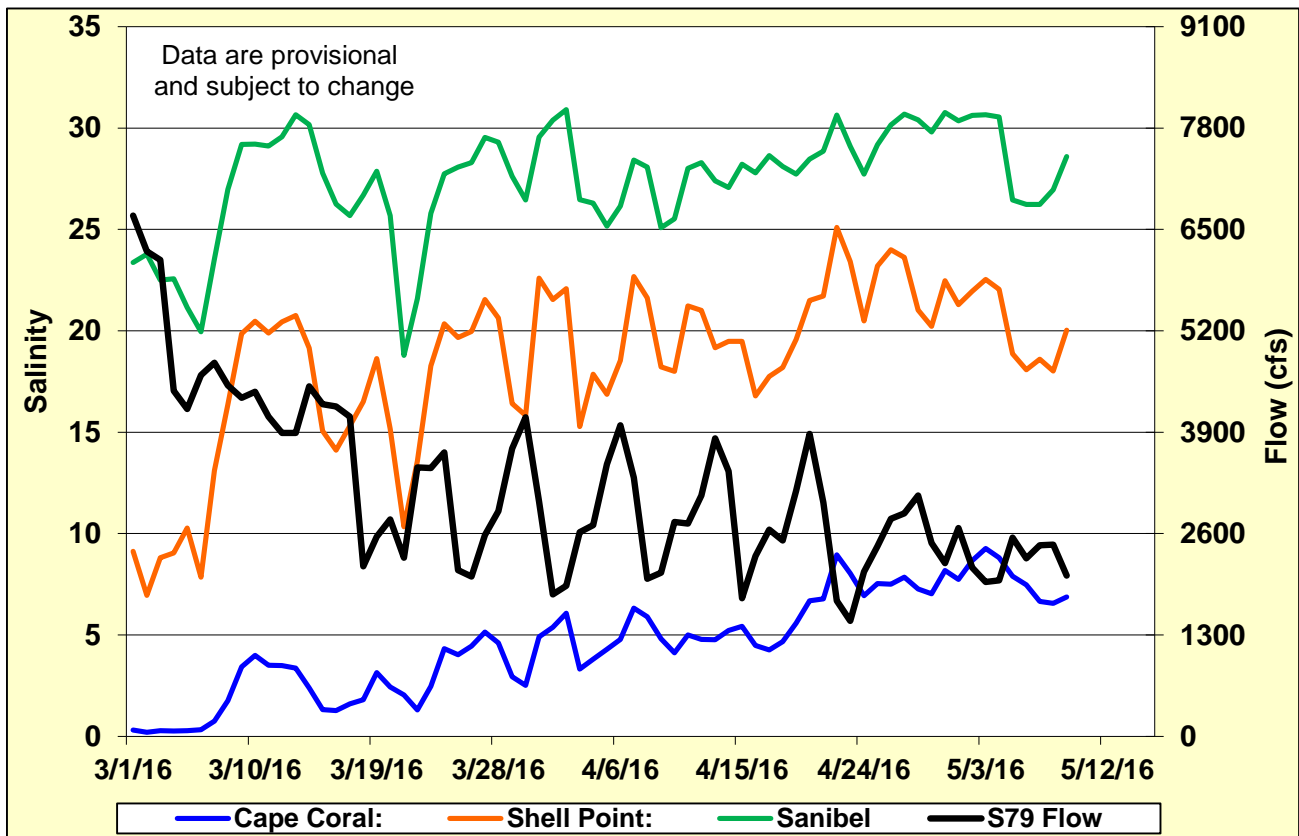


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

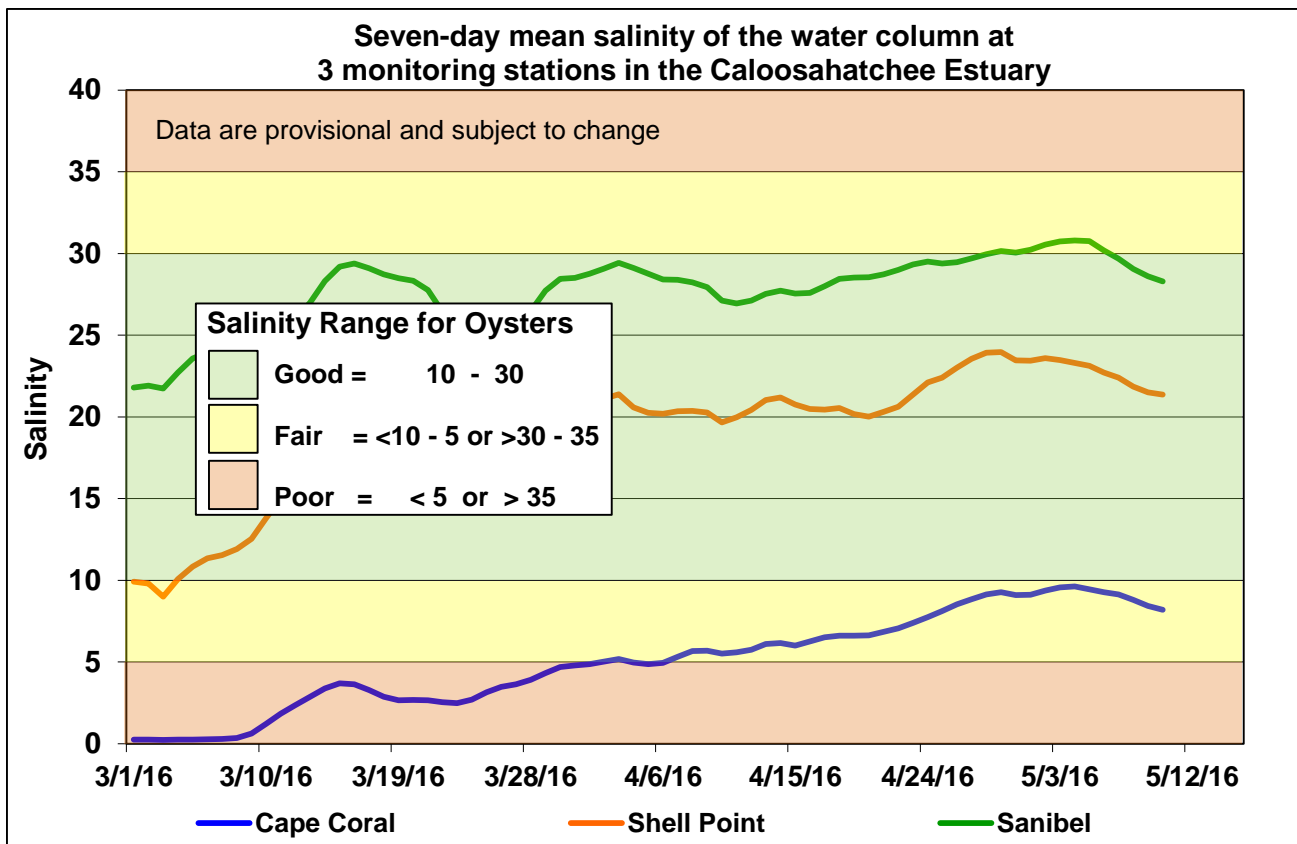


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

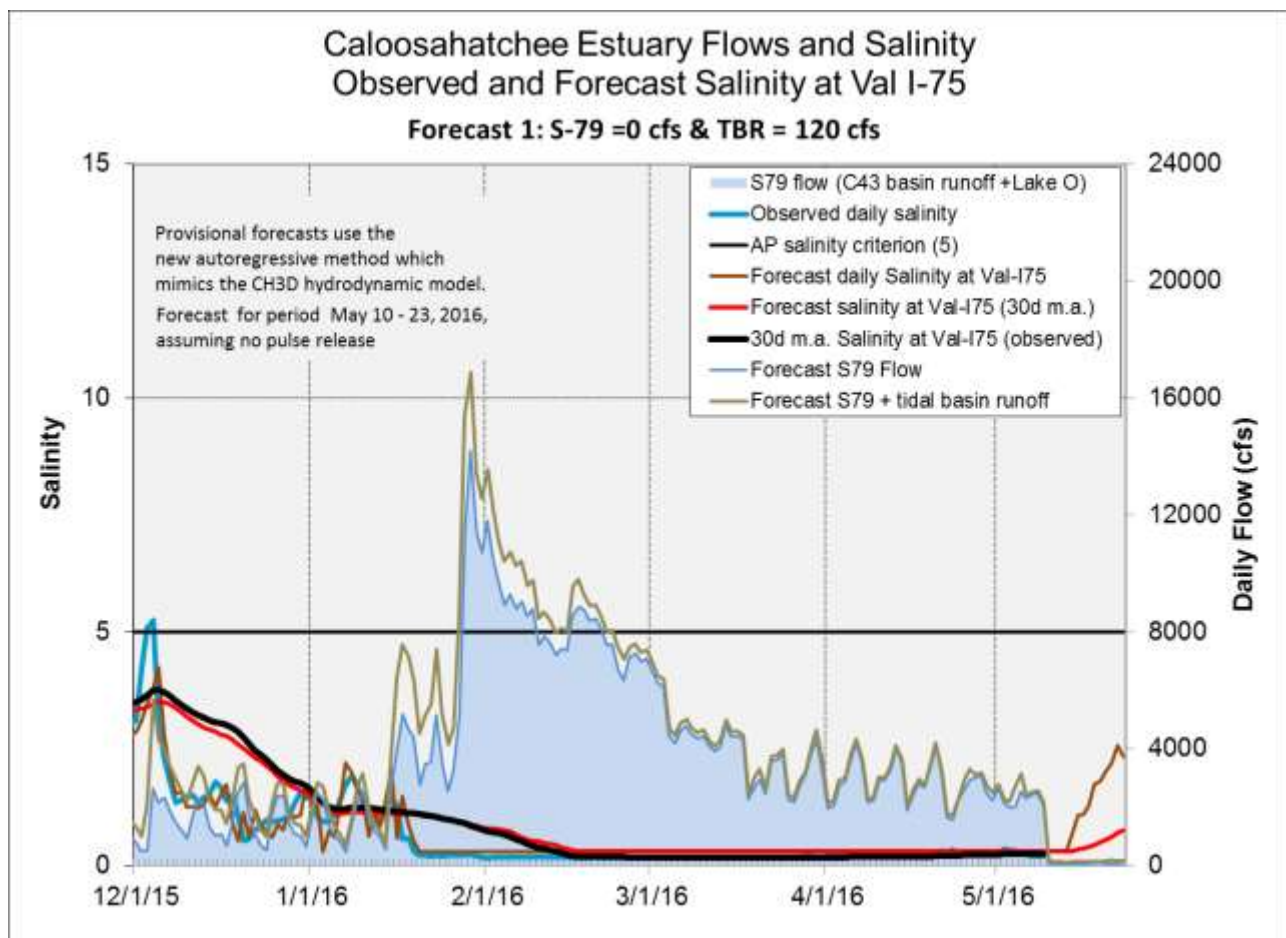


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

GREATER EVERGLADES

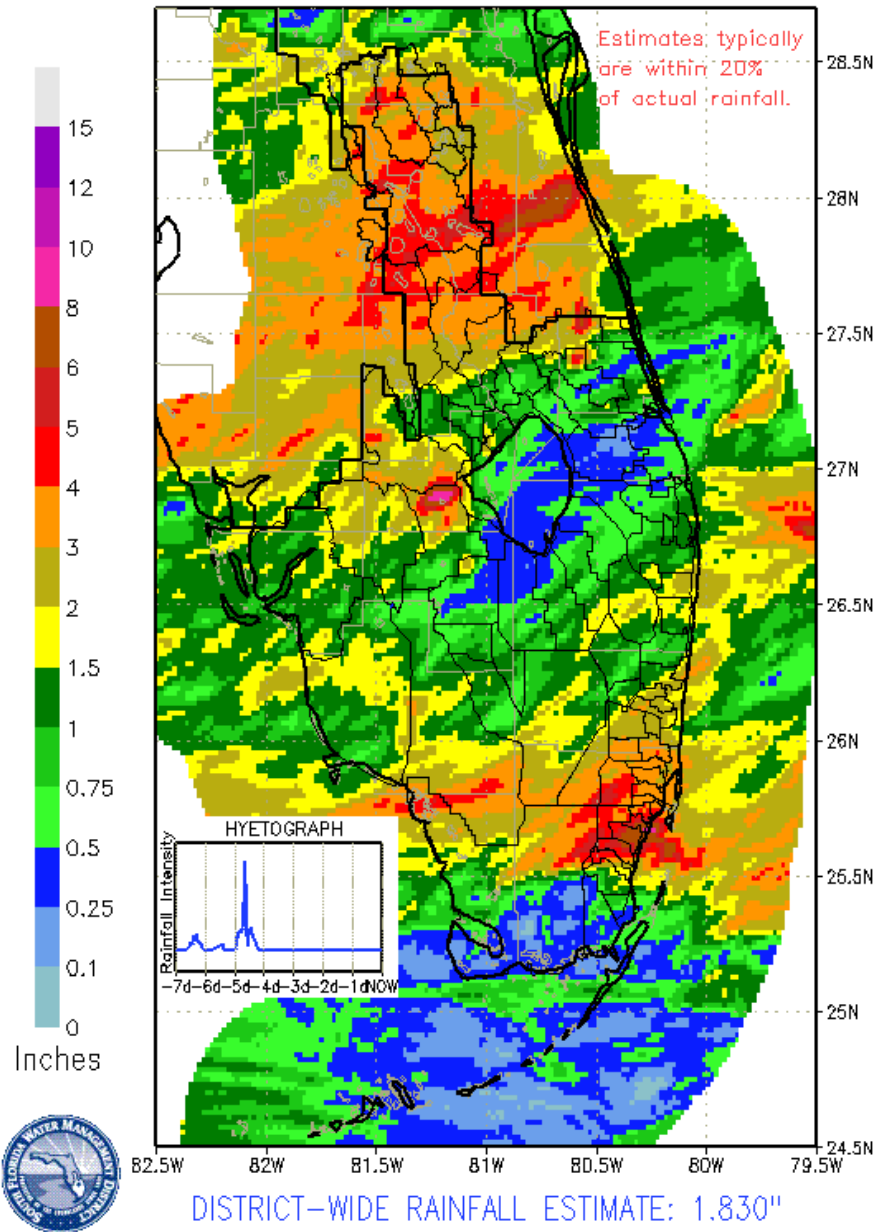
Rainfall was moderate to locally heavy last week with the highest rain of 5.7 inches occurring in southern WCA-3B and northeastern Everglades National Park (ENP). Basin stage changes ranged from -0.10 feet to +0.20 feet. Pan evaporation was 1.52 inches, which is lower than the historic average of 1.61 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.41	0.05
WCA-2A	1.09	0.02
WCA-2B	1.09	-0.10
WCA-3A	1.56	-0.04
WCA-3B	2.96	0.11
ENP	1.56	0.16

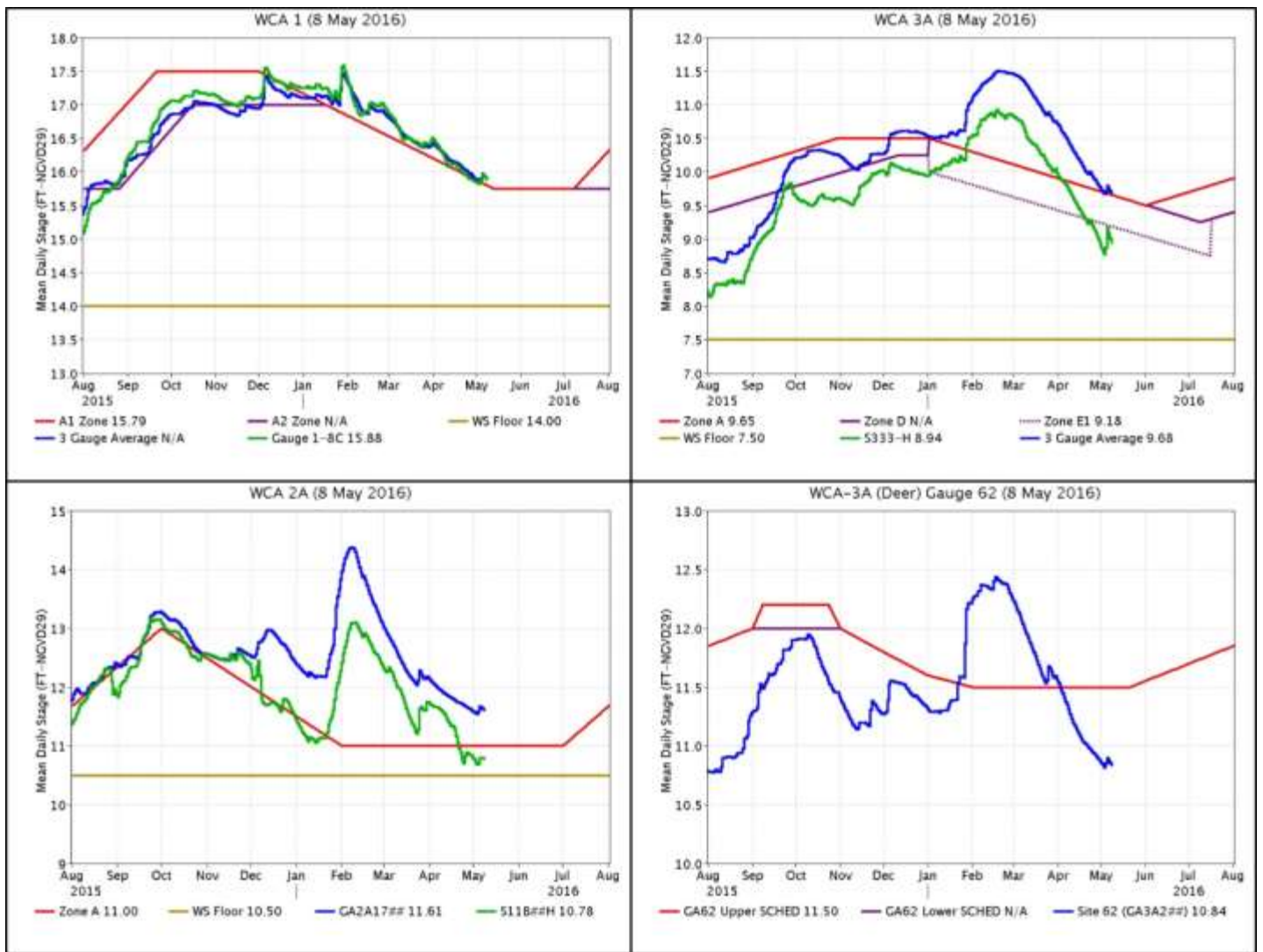
	Good
	Fair
	Poor

SFWMD PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0515 EST, 05/02/2016 THROUGH: 0515 EST, 05/09/2016

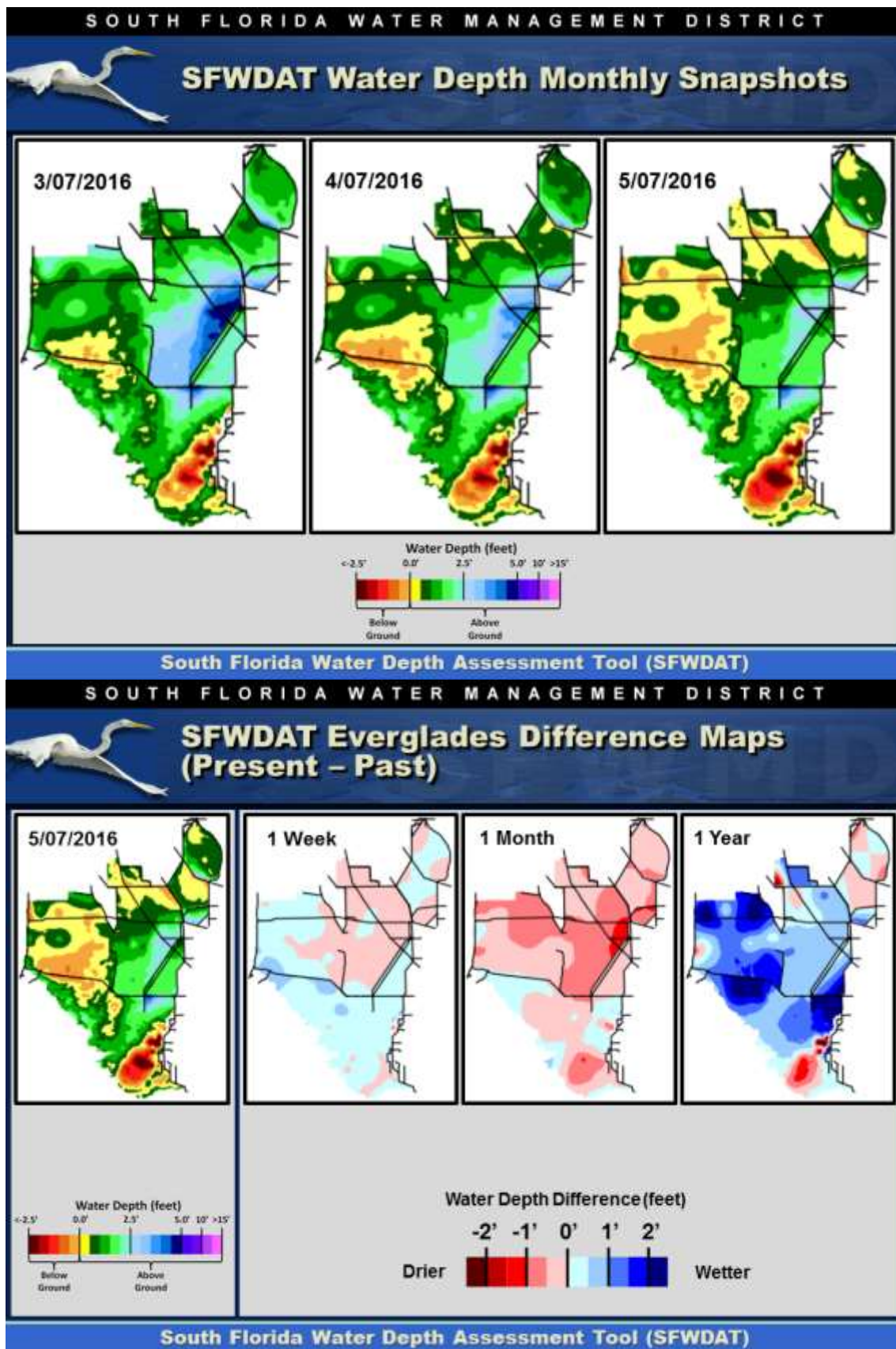


Regulation Schedules: Rainfall of the last week produced stage reversals within WCA-1, -2A, -3B, and ENP. The WCA-1 and WCA-3A stages are almost at regulation. The WCA-2A stage increased to 0.61 feet above regulation, and the northwestern WCA-3A gauge stage (gauge 62) has decreased slightly to -0.66 feet below the upper schedule.

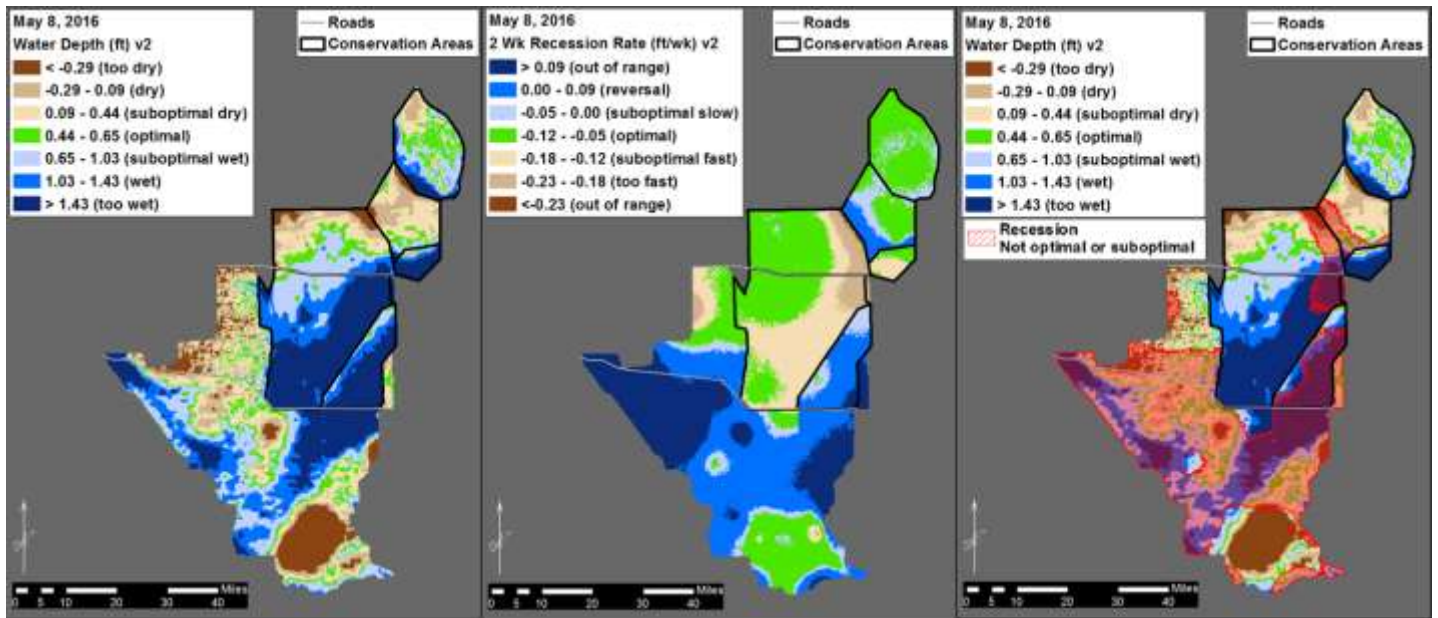


Water Depths and Changes: Water levels continue to decrease and are lower than they were one and two months ago. Very few areas are now above 2.5 feet deep. Water depths at the monitored gauges (except WCA-2B) range from 0.49 feet to 2.25 feet (in northern ENP).

Stage changes were mixed this past week. Water depths in most areas are up to 1.5 feet lower than a month ago, but some areas within ENP are higher than a month ago. Relative to a year ago, stages are mostly higher with a few exceptions such as the area just north of Taylor Slough.



Reversals in water depth made most of ENP unsuitable for foraging.

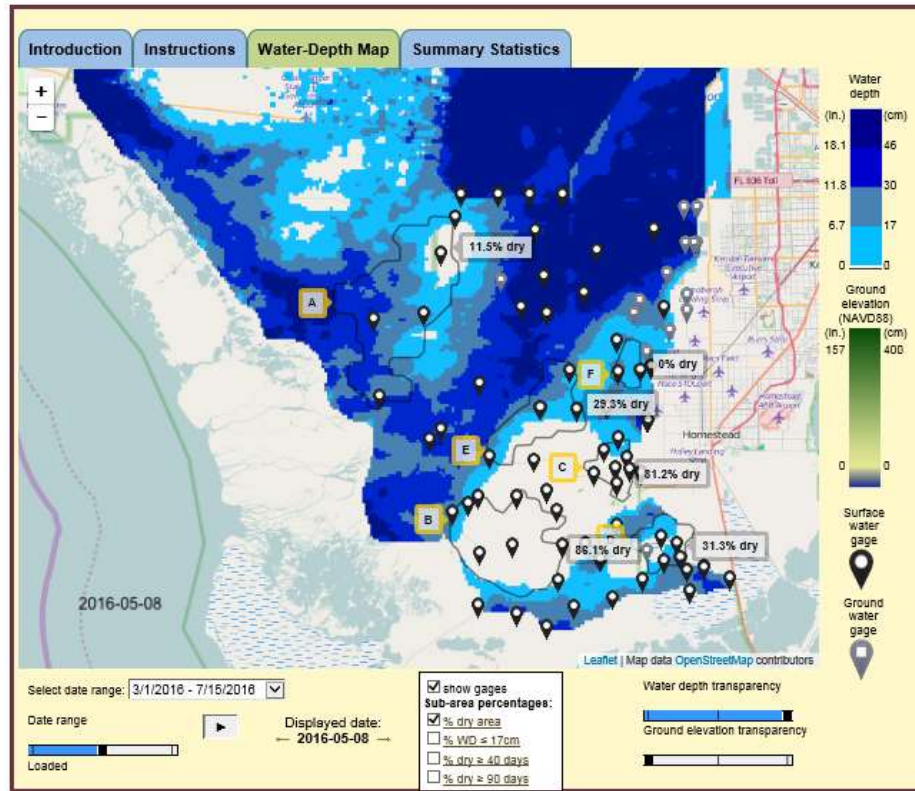


Wading birds:

Water levels are now good for foraging in some of the longer hydroperiod marshes, and the birds are responding by foraging in quite large numbers. Monday, there were about 1,000 birds foraging in the northeast of WCA-1 and about 4,000 birds in southeast WCA-2A. Flocks were a mix of all species including wood storks and spoonbills.

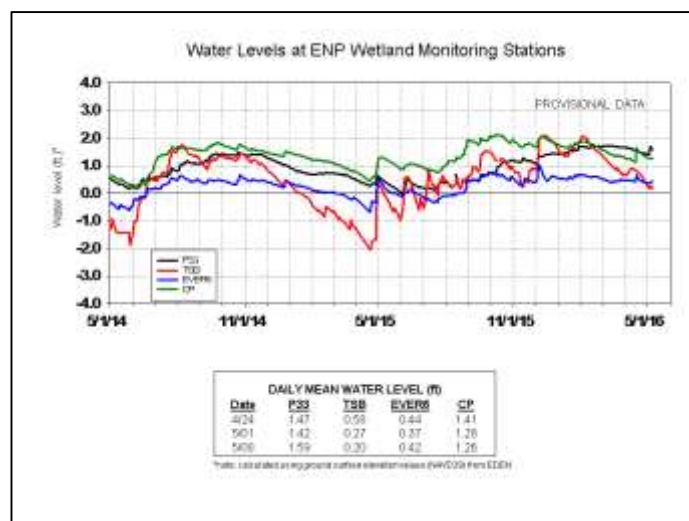
These foraging conditions might induce a late surge in ibis nesting. Monday, there were 300 to 400 ibis in breeding colors in Alley North colony looking like they were starting to breed. Also, some of the ibis in the foraging flocks were in breeding color, a good sign that they are about to nest.

Cape Sable Seaside Sparrows: Heavy rainfall over the northern Everglades reversed the drying trend. However, recession has resumed over the last several days. Maximizing late season breeding opportunities will be beneficial, if conditions improve by May/June. Surveys have started, and there are signs that breeding may be starting.

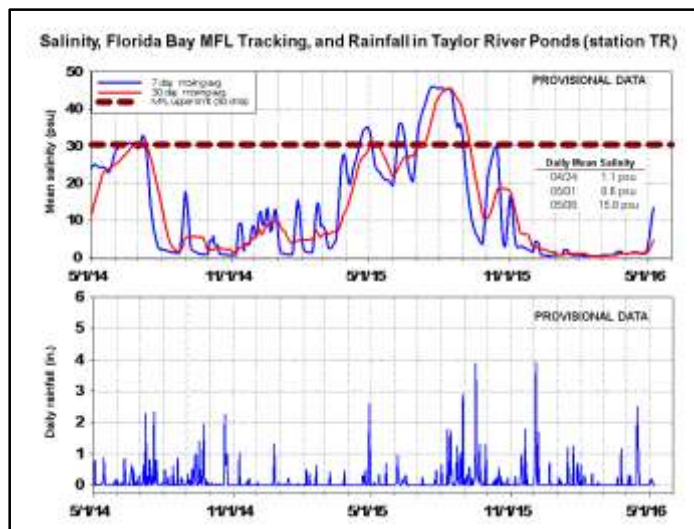
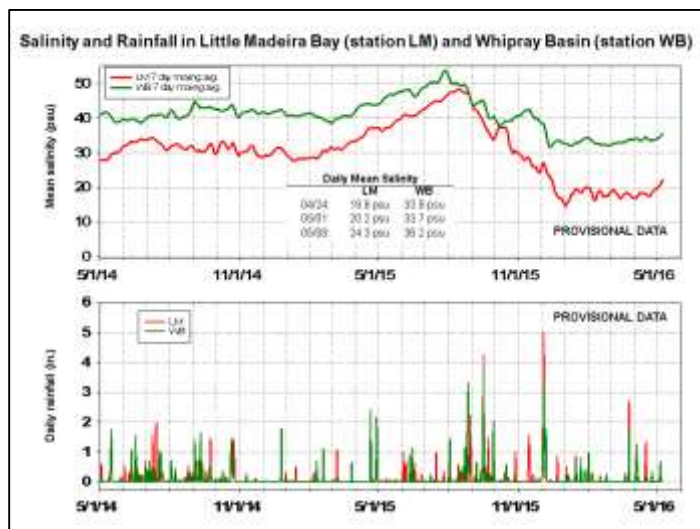


Everglades National Park (ENP) and Florida Bay: Water level changes were mixed last week in Taylor Slough with the panhandle area having increased and the northern and western areas having decreased. Taylor Slough, including the northern parts, and the ENP panhandle remained eight to ten inches above average. Northern Taylor Slough is typically dry by mid-February, but currently is 0.2 feet deep.

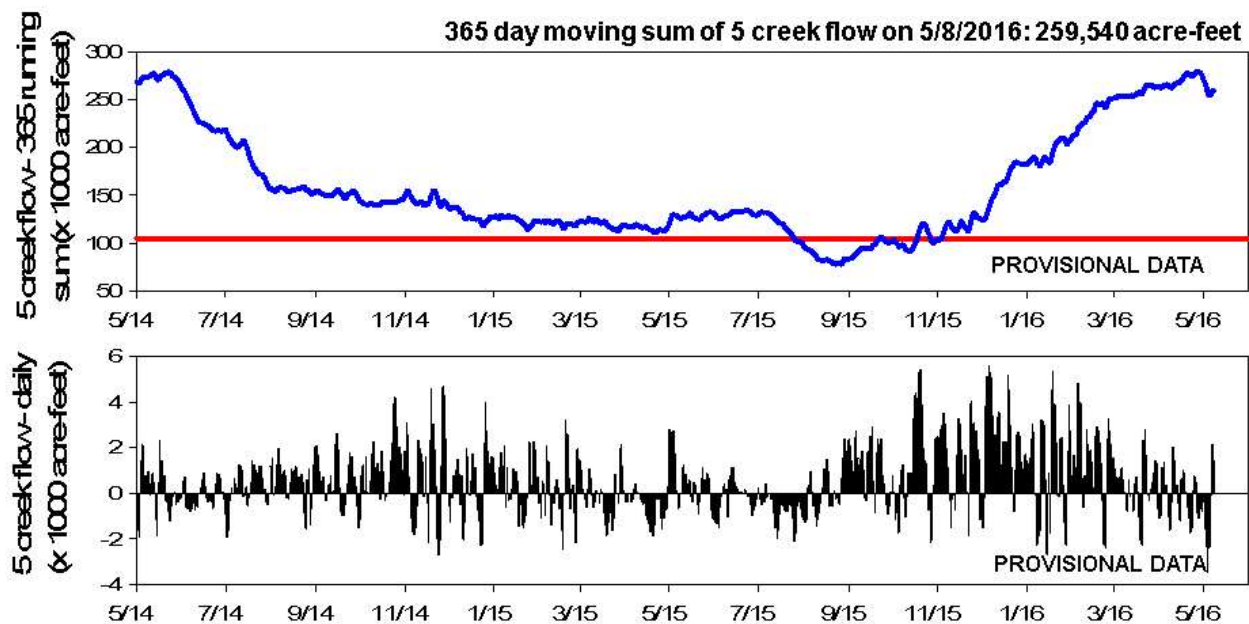
Salinities in eastern Florida Bay rose slightly over the past week with the largest change being 4.1 psu in the Taylor Slough nearshore areas. The bay is -2.5 to -6 psu below average with salinities that range from 23 to 37 psu. Upstream in the mangrove ecotone, the daily average salinity at the MFL sentinel site of TR rose rapidly to 15.8 psu due to an upstream surge of saline water, but it is still below the seasonal average of 22 psu. The 30-day moving average salinity at TR increased to 4.6 psu while the typical 30-day moving average salinity for this time of year is about 22 psu and rising. Below average conditions in salinity are desirable and are a restoration target.



The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay decreased about 11,000 acre-feet to 259,540-acre-feet, still above the long-term annual average of 257,628 acre-feet. The weekly (May 2 to May 8) cumulative flow from the five creeks was 1,778 acre-feet that is above average for this time of year that normally has negative flows.



5 Creek Cumulative Flow and Florida Bay MFL Flow Criteria Tracking



Water Management Recommendations

- For the upcoming wet season, water depths should remain below 2.5 feet in far southern WCA-3A to protect the island forests.
- In general, conditions have improved for wading bird foraging and nesting. Large mixed-species foraging flocks were witnessed this week. Now that conditions have improved, slower recession rates through the end of May are desired to support foraging and nesting.
- Inflows into WCA-2A and northern WCA-3A may occur so long as they do not cause increases in stage. Lower stages throughout the WCAs are ecologically necessary for wading bird foraging and ecosystem improvement through June.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, May 10, 2016 (red is new)				
Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages increased 0' to 0.11'	Rainfall, ET, management	Match inflows with outflows to achieve regulation schedule recession while allowing water levels to reflect variation in annual rainfall. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting.
WCA-2A	Stage increased 0.02'	Rainfall, ET, management	With depths below 1', manage recession rates to favor wading bird foraging (-0.05' to 0.12' per week).	Recession rates should be managed to favor wading bird foraging and nesting (-0.05' to 0.12'). WCA-2A is now open again to the public.
WCA-2B	Stages decreased -0.10'	Rainfall, ET, management	Follow normal seasonal practices.	High stages generally preclude wading bird use, but can provide good habitat for wading bird foraging as stages decline at the end of the dry season.
WCA-3A NE	Stage decreased -0.07'	Rainfall, ET, management	Small inflows into WCA-2A and northern WCA-3A may occur so long as they do not cause increases in stage. Lower stages throughout the WCAs are ecologically necessary for wading bird foraging and ecosystem improvement.	Recession rates should be managed to favor wading bird foraging (-0.05' to 0.12') in northeast WCA-3A. WCA-3A is now open again to the public.
WCA-3A NW	Stage decreased -0.02'	Rainfall, ET, management		
Central WCA-3A S	Stage decreased -0.07'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Water depths are below 2.5'. Water depths should remain below 2.5 feet over this upcoming wet season to protect the island forests. When flows are reduced, a gradual reduction is recommended (stepping down over several days).	Continue to provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Keeping depths below 2.5' is important to allow tree island vegetation to recover from stress of the recent extended inundation duration.
Southern WCA-3A S	Stage increased 0.01'	Rainfall, ET, management		
WCA-3B	Stages increased 0.04' to 0.20'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Continue to provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Once depths are closer to 1', manage recession rates to favor wading bird and snail kite nesting and foraging (-0.05' to 0.12').
ENP-SRS	Stages increased 0.16'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B are closed to enhance dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTTP closures for S12-A and B. Gradual reduction in flows through S333, S12C and D, as possible, is recommended (stepping down over several days). Reduced flows through S333 would benefit wildlife. Follow guidance in C-111 western spreader canal project operations manual.	Provide appropriate hydrological and habitat conditions for wildlife.
Taylor Slough	8-10 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	-2.5 to -6 psu below average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.